245-298

G. R. S. 59]

GENERAL AND REVENUE SECRETARIAT.

1911-12.
(Genl. Misc.) ✓

File No. 245-11

Serial Nos. 1-2

Papers Filed.

Month April 1912

SUBJECT.

Govt of India publication of Specifications of Inventions.

PREVIOUS REFERENCES.	LATER REFERENCES.
	Sls 3-4 of the same file

K.N. Krishnaswamy Ayyar 20-4-12

G.R.S. 11] 191/-12

GENERAL AND REVENUE SECRETARIAT.

(Gen : Mis)

NOTES.

Gen File No.245-11/12

FILE HEADING.

Govt of India publication of specifications of inventions

From

The Controller of Patents and Designs, Calcutta.

No. 1184 P Dated 1. 3. 12 Received 5. 3. 12

Diary No.3761	Enclos. 4 Spare Copies.	Serial No. 1

BRIEF ABSTRACT OF LETTER.

Forwards ~~received~~ copies of the first 4 specifications printed under the provisions of the Indian Patents and Designs Act II of 1911 and Rules there and enquires whether the Mysore Govt are prepared to accept a complete set comprising about 600 specifications annually.

NOTES AND ORDERS.

To Branch III for kindly putting up the Act referred to in the above

Rec'd 1-3-13

GA 99 11.3.12

VS. 4/1

4/VS/1913

Part II of Gazette of India of 23/9/11

Applied

NOTES—First Sheet.

GPB—30,000—12-8 11

G. R. S. 12]

(2)

General and Revenue Secretariat.

G.R. File No. 245 of 1911-12

Serial No.

3761

pages 1437 & 1494 containing the Rules issued by the Govt of India under the Indian Patents and Designs Act, II of 1911, is herewith put up. The Gazette (March 1911) containing the Act are all under submission in different files. They may therefore be got from the Gl. Records.

(8) SN (11)
15/4/12

Dy Branch V

Subd

Part IV, pages 2 to 17, of the Bombay Govt Gazette, herewith putup contains ~~Act~~ the Indian Patent Designs Act II of 1911.

Each of the printed copies of the Specfn is priced at annas 8 but no mention is ma about it in the covering letter of the Controller of Patents and Designs

From Sec 72 of the Act, it appears that printed copies of the Specfn are to be sent to the several local Govts and other authorts with a view to them being kept open for inspection by any person at all reasonable times at places to be appointed by those authorts A copy of the specfn of each of the inventn patented in Mysore is invariably being sent to the Museum and if it is decided

As it is sent to the local Govts for giving wide publicity it is presumed the cost is not to be recovered from such Govts - the Bombay also not the

NOTE—Contn. sheet.

GPB—20,000—20-1-12

G. R. S. 12]

General and Revenue Secretariat.

File No. 245 of 1911

Serial No.	
3761	to accept the offer of the Controller of Patents, copies received from the latter may perhaps also be sent to the Museum, and necessary intimation submitted for orders.

CA99
16.3.12
PR44

A reply may be given in the affirmative, after making sure if necessary, that we shall not be required to pay the price of the copies ~~supplied~~ sent to us for record &c.

Secretary) 16/3/12

Yes - Please prepare draft accordingly

Draft subd
CA99
2.4.12 VS. 4.1

CSB
3/4/12

Secy) 4.4.12

Issue

CSB
6/4/12
SA
6/4/12

2	To. F. A. Resident Pol No. 865 & 11.4.12 I awards a copy of the above

NOTE—Contn. sheet.

GPB—20,000—20-1-12

G. R. S. 12]

General and Revenue Secretariat.	File No. 265 of 1911
Serial No.	and request to inform the Controller of Patents that the Durban have no objection to receive the set in question

17-4

NOTE—Contra. sheet.

GPB—20,000—20-1-12

No. 1184-P

Government of India.

THE PATENT OFFICE.

1 Council House Street,
Calcutta.
The

DIARY No. 3761

1911-1912
SECTION Gen: Mis
FILE No. 245 of 1911-12
SERIAL No. 1

From

H. C. Graves, Esq.,

Controller of Patents & Designs.

To

The Secretary to the Govt. of Mysore,
General & Revenue Department.
Mysore.

Sir,

I have the honour to forward copies of the first four specifications printed under the provisions of the Indian Patents and Designs Act (II of 1911) and Rules which came into force on the 1st January 1912, and to enquire whether you are prepared to accept a complete set. It will comprise about 600 specifications annually and the documents would be forwarded weekly in batches of about 10 to 20.

2. It is intended that the distribution of the specifications throughout India shall be as extensive as possible in order (a) to afford information to the public generally on the most recent inventions for improvements in manufacture, and (b) to give the public an opportunity of objecting to the grant of a patent when it is thought that such grant is not justified. For this purpose the sealing of a patent is suspended in every case for three months after acceptance and publication of the specification.

3. Hitherto it had not been possible to make as wide a circulation as was deemed desirable owing to the fact that the

Yours,

Consul for Navarro Department.

The Office Secretary to the Govt. of [illegible]

specifications of inventions were not printed under the old Act (V of 1888). There were only four manuscript copies available for distribution and those were sent to the offices named in the margin where they were open to inspection on payment of a fee of one rupee.

Madras- Record Office, Egmore.
Bombay- Record Office.
Rangoon- Office of the Revenue Secretary to the Government.
Cawnpore- Office of the Director of Industries, United Provinces.

4. I would be glad if you let me know as early as possible whether I am to continue sending the publications, and if so whether the public will be allowed free access to them. It is desirable that these specifications and other publications of the Patent Office should be easily accessible to enquirers.

I have the honour to be,

Sir,

Your most obedient servant,

H H Brown.

Controller of Patents and Designs.

GOVERNMENT OF INDIA.

3/1911

THE PATENT OFFICE,

1, COUNCIL HOUSE STREET, CALCUTTA.

SPECIFICATION

No. 1. 2nd January 1912.

(NOTE.—*The application for a patent for an invention of which this is the specification was accepted on* **5th February 1912.** *The acceptance is advertised in the next issue of the "Gazette of India." Within three months from the date of the advertisement, notice of opposition to the grant of the patent may be given under § 9 of the Indian Patents and Designs Act, 1911, and Rule 14 of the Indian Patents and Designs Rules, 1912.*)

IMPROVED PROCESS AND APPARATUS FOR STERILISING AND PURIFYING LIQUIDS AND REGENERATING PERISHABLE LIQUIDS AND MATERIALS.

DOUGLAS LEICESTER VERNON BROWNE AND JEAN MASSON, BOTH OF 38, RUE DES PERCHAMPS, PARIS, FRANCE.

The following specification particularly describes and ascertains the nature of the invention and the manner in which the same is to be performed.

The ordinary sterilising processes have for their essential object to kill the bacteria or other micro-organisms contained or generated in the liquids to be treated owing to the changes which may be produced in the medium by the development of those organisms (as in fermentations for example). The sterilising process must also, if it is desired to eliminate the suspended matter (such as dust or other particles, dead germs, etc.), be completed by filtering the treated liquid, for instance by means of a Chamberland porcelain apparatus.

Among sterilising processes there may be mentioned those processes employing chemical agents, that is to say, processes requiring for their application the use of reagents which modify by their mere presence the nature or properties of the medium to be sterilised, and process employing physical agents, such as sterilisation by heat, ozone, the ultra-violet rays or other invisible emanations of the spectrum.

In the last-mentioned processes, a source of heat, ozone, etc., is utilized, working externally and independently of the medium, and producing physical sterilising agents which are introduced into the liquid in the same manner as are the chemical agents and which are intended by acting through the liquid to fix and kill the micro-organisms.

A sterilising process of this kind is perfect when it acts upon all living things in the medium, without changing the nature or properties of the medium. In general, however, the sterilising process does not leave the medium unaltered, and its action similarly to the use of chemical agents has the result of changing the essential properties of the medium. Thus, water sterilised by heat becomes heavy and indigestible, water sterilised by ozone is converted into oxygenated water, and milk sterilised by the ultra-violet rays is liable to ferment or undergo decomposition, etc.

Now the present invention has for its object to provide an improved sterilising process which is differentiated from existing processes by the feature that instead of obtaining independently of the medium to be treated, and with the help of suitable sources, sterilising agencies which are then

Price: EIGHT ANNAS.

introduced into the medium, the desired life-destroying agencies are produced in and by means of the medium itself. In other words, in the known sterilising processes employing physical agents, such as radiations capable of suspending or destroying life, there are employed sources which generate these agents by their own self-sufficient nature or operation without requiring the presence of the medium for such generation; the medium to be sterilised being subjected only to the action and effects of the generated agents.

In the improved process the sterilising physical properties can come into being only by means of and in the medium, the physical means used producing no special property when they are considered separately.

The improved process consists substantially in subjecting the medium to be treated to the action of a weak current of electricity which is introduced by means of couples of electrodes of aluminium or alloys of aluminium, the elements of each couple being arranged parallel to and at a short distance from each other. The carrying out of the improved process has shown further as regards the results, in contradistinction to what happens in the known sterilising processes, that the properties of the medium, instead of undergoing any alteration, are rather intensified, and in the case of perishable properties are bettered or restored.

Further, to the sterilising and life-destroying action proper there is added a physical purifying action which produces an enveloping agglomerating and precipitating effect upon the organisms and also on the solid matters, dust, etc., suspended in the liquid.

The sterilising process is thus completed by a self-separating action having the same result as a filtering process, but having also the advantage that the perfection of the separation does not depend in any way on the quality of the porous partition of a filter or on the hidden defects in its wall. The coloring or non-coloring suspended matters collect in the form of a floating supernatant layer or of a precipitate sinking to the bottom of the vessel in which the treatment takes place, and in such a manner that notwithstanding the subsequent agitation of the medium, these precipitates are no longer able to enter into solution, and will also resume, in a state of rest, the form of a deposit or a layer floating on the surface, which will allow of the treated liquid being decanted or drawn off.

I have also discovered that the sterilising action of the couple seems to produce in the treated medium a new property, doubtless of a radio-active nature, of which the effects are permanent and continue even after the cessation of the cause by which it has been produced. Namely, after treatment, and after the removal of the electrodes, I have discovered, by the movements occurring in the medium, that the flaking action continues to which the suspended matters are subjected. I have also discovered that this property, within certain limits and up to the saturation of its effects, is able to prevent all biotic seeding inasmuch as it kills the micro-organisms introduced into the medium. The toxic excreta appear to be neutralised. Finally, the new properties imparted to the medium become inherent in it, so that the treated medium can act of itself as an antiseptic agent, more especially with reference to the solid bodies which are bathed or impregnated with it.

The improved process, which is more particularly applicable for purifying and sterilising drinking water or waste waters, may also be employed for treating, bettering or regenerating fermentable or perishable liquids.

Some forms of apparatus for carrying out the improved process are illustrated by way of example in the accompanying drawings in which—

Figure 1 is a perspective elevation of one form of electrode suitable for introducing the electrical energy into the medium to be treated,

Figure 2 is an elevation partly in vertical section of one form of apparatus, and

Figure 3 is a vertical section of another form of apparatus for purifying and sterilising water,

Figure 4 is a vertical section of a portable form of the improved apparatus for household use, for explorers, etc.,

Figures 5, 6 and 7 illustrate a form of apparatus suitable for treating fermentable liquids, such as grape must, wine, milk, etc.

Figure 5 is a separate perspective elevation of the internal parts of the apparatus,

Figure 6 is a separate perspective elevation partly in section of the outer part of the apparatus, and

Figure 7 is a perspective view partly in section of the parts shown in figures 5 and 6 combined together to form the apparatus. In the apparatus shown in figures 5, 6, 7, the electrodes are adapted to receive continuous or intermittent rotary motion in the mass of liquid to be treated which is divided by them into parallel sheets or strata.

The electrodes *a b* consist of plates or strips of aluminium or preferably of aluminium alloys containing small percentages or even infinitesimal quantities of other substances, such as carbon, iron, silicon, bismuth, whose presence, relatively to the mass of aluminium and the medium to be treated, appears to give rise to local voltaic currents having a special exciting effect as regards the production of internal radio-active phenomena.

As an example, an alloy consisting of 99·5 per cent. of aluminium and 0·5 per cent. of iron and carbon will produce with a diminished electrical current a sterilising effect equal to that produced by a stronger current passed by electrodes of pure aluminium into the mass of the liquid to be treated.

In the example shown, the electrodes *a b* having the same nature but alternate polarities, are arranged at short distances apart from one another so as to leave narrow passages in which the liquid in the form of thin sheets or strata is subjected to the aforesaid actions of sterilisation and physical purification.

The matters, which are precipitated in the form of a floating layer or as a deposit, are separated from the liquid under treatment, if necessary, and in any known way by means of filters *t* or by decantation. The liquid flowing out continuously, passes in the form of apparatus shown in figure 2 into a trough containirg sloping plates *u* between which are channels along which the liquid rises, leaving behind its remaining impurities which flow into the trough whence they may be discharged. The liquid is collected at the upper part of the plates *u* which are constructed like the active electrodes *a b* without, however, being subjected to any electrical current. By their own nature and mere presence in the liquid under treatment these plates *u* produce a weak voltaic current that continues the action started by the electrical current in the treating trough.

In the form of apparatus shown in figure 3, a series of sloping plates *u*, having the same function as the corresponding plates of the apparatus shown in figure 2, is arranged in the lower part of the first trough around the water inlet pipe and below the battery of electrodes *a b*. The water which has been treated is led into a vessel containing filters *t* below which are sloping plates u^1 similar to the plates *u* in the first trough but sloping in the opposite direction.

The form of apparatus shown in figure 4 serves solely for purifying and softening water for domestic purposes. It consists of a portable vessel or trough in which is a compartment containing a magneto-machine *v*. Cylinders *a b*, of aluminium, constituting the electrodes arranged concentrically so as to form between them annular compartments are connected alternately to the poles of the electrical machine *v*. The liquid is admitted into the outer compartment and thence successively into each of the concentric compartments between the electrodes *a b* ; it then passes finally into the central compartment.

The water is received and the suspended matters in it are arrested by a filter *t* through which it passes and in which it collects and whence it may be discharged through a discharge cock in the bottom.

In the form of apparatus shown in figures 5, 6, 7, the electrodes *a b* are arranged parallelly to one another, according to alternate poles in a vessel *c;* they are carried by a central axle *d* which serves as a conductor and also enables continuous or an intermittent rotary motion to be imparted to them.

The axle is furnished with a handle *s* for operation by hand, and is connected metallically to the plates *a b* of the same polarity surrounding it. The plates of same polarity are connected to one another by metallic cross pieces *e* and are insulated from adjacent plates by spacing pieces *f* of suitable insulating material. The central axle *d* is supported in a footstep bearing g^1 and carries an insulated ring *h* on which rub brushes *g* connected to a terminal *k* on the cross shaped support *m*.

The latter also carries a terminal *n* to which is connected a brush *o* bearing directly upon the conducting axle *d*. The ring *h* is connected to the corresponding electrode plates by an insulated conductor *p* which extends through the hollow axle *d* by means of apertures *r* therein.

With this apparatus the radio-active and bactericidal action, due to the use of the improved process and the above-mentioned means, may be rendered uniform and be conveyed throughout the substance under treatment, so that

although this action can be propagated gradually throughout a liquid at rest, there is the certainty that all the ferments or micro-organisms are reached owing to the renewal of the parts that are in direct contact with the electrodes *a b*. In this manner all fermentation is arrested in the case of perishable liquids, and even a regeneration of the altered liquid may be effected.

This treatment is applicable to sugars, sugar juices, wines, spirits, musts, ciders, alcoholic drinks, etc., for rectifying, purifying, regenerating and even ageing them.

The process is also applicable to cases where water is employed as medium for cleaning, degreasing, sterilising, etc., substances of vegetable or animal origin. Thus it may be used for degreasing wool, degumming fibrous textile materials, such as flax, ramie, etc., for treating oils, for disinfecting, bleaching or deodorising waste matters such as waste liquors, waste of all kinds, and for rendering antiseptic vegetables, fruits and other articles of food.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—

1. The process and apparatus for sterilising and purifying perishable liquids and substances, wherein there are developed in and by means of the medium to be treated, under the action of a weak current which is introduced therein by means of couples of electrodes of aluminium or aluminium alloys arranged parallel to one another at small distances apart, radio-active and abiotic (germicidal) properties acting upon micro-organisms, and also agglomerent and flocculent properties which add to the biological purifying action, a physical purifying action by enveloping and precipitating the organic or inorganic matters suspended in the medium, substantially as hereinbefore described.

2. For carrying out the process specified in claim 1, the use of couples of fixed or movable electrodes in the medium under treatment, composed of alloys of aluminium containing small or even infinitesimal quantities of metallic or other substances, such as iron, carbon, silicon, bismuth, for producing with the main constituent, in the presence of the liquid, a partial radio-active action which is increased by the introduction of the electrical current and completed by the production of flocculent actions, substantially as hereinbefore described.

3. The use of the process and apparatus specified in claim 1 or claim 2, for sterilising and purifying drinking waters, calcareous waters, waste liquors, and also for producing antiseptic media for the sterilisation of solid bodies or substances which are bathed or impregnated therewith.

4. The use of the process and apparatus specified in claim 1 or claim 2, for maturing or ageing wines, spirits, for preventing lactic and other fermentations, for destroying such fermentations, for clarifying beers, for purifying and regenerating organic liquids liable to ferment or become sour by contact with the atmosphere, such as wines, musts, syrups, molasses, ciders, alcohols and other substance.

5. The use of the process and apparatus specified in claim 1 or claim 2, for cleaning, degreasing, bleaching and degumming rubber and fibrous materails, such as wool, cotton, jute, hemp, flax, ramie and others.

6. The use of the process and apparatus specified in claim 1 or claim 2, for treating sugars and sugar juices, for the purpose of removing dust and other foreign matters.

7. The improved process of treating liquids and solids for the purpose of sterilising, etc., the same, substantially as hereinbefore described.

8. The improved apparatus for carrying out the process specified in any or all of the preceding claims, constructed and operating substantially as hereinbefore described and also as illustrated in and by the accompanying drawings.

D. L. V. BROWNE,

J. MASSON,

by their Attorney and Agent,

RUPERT REMFRY.

CALCUTTA : PRINTED BY SUPDT. GOVT. PRINTING, INDIA, 8, HASTINGS STREET.

Fig.2.

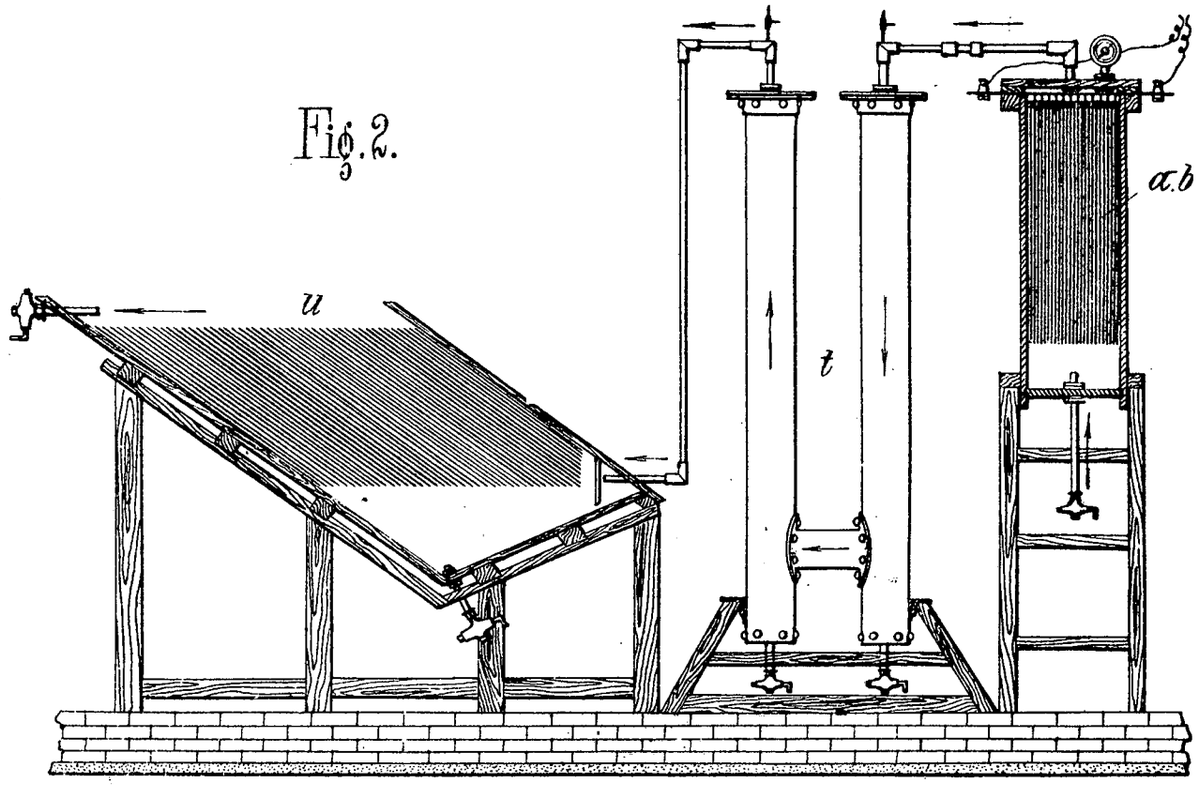


Fig.3.

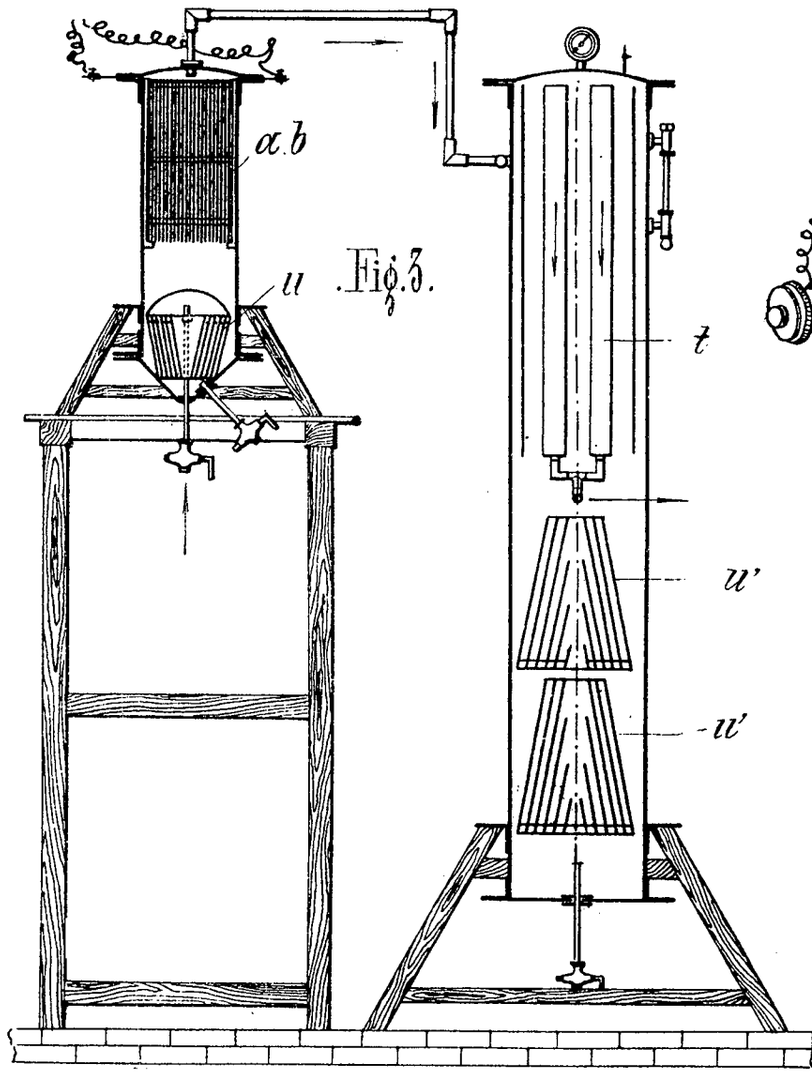


Fig.1.

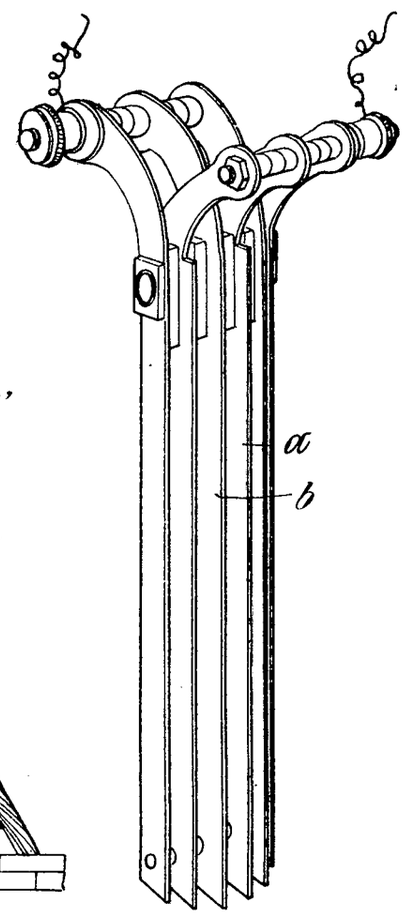


Fig. 4.

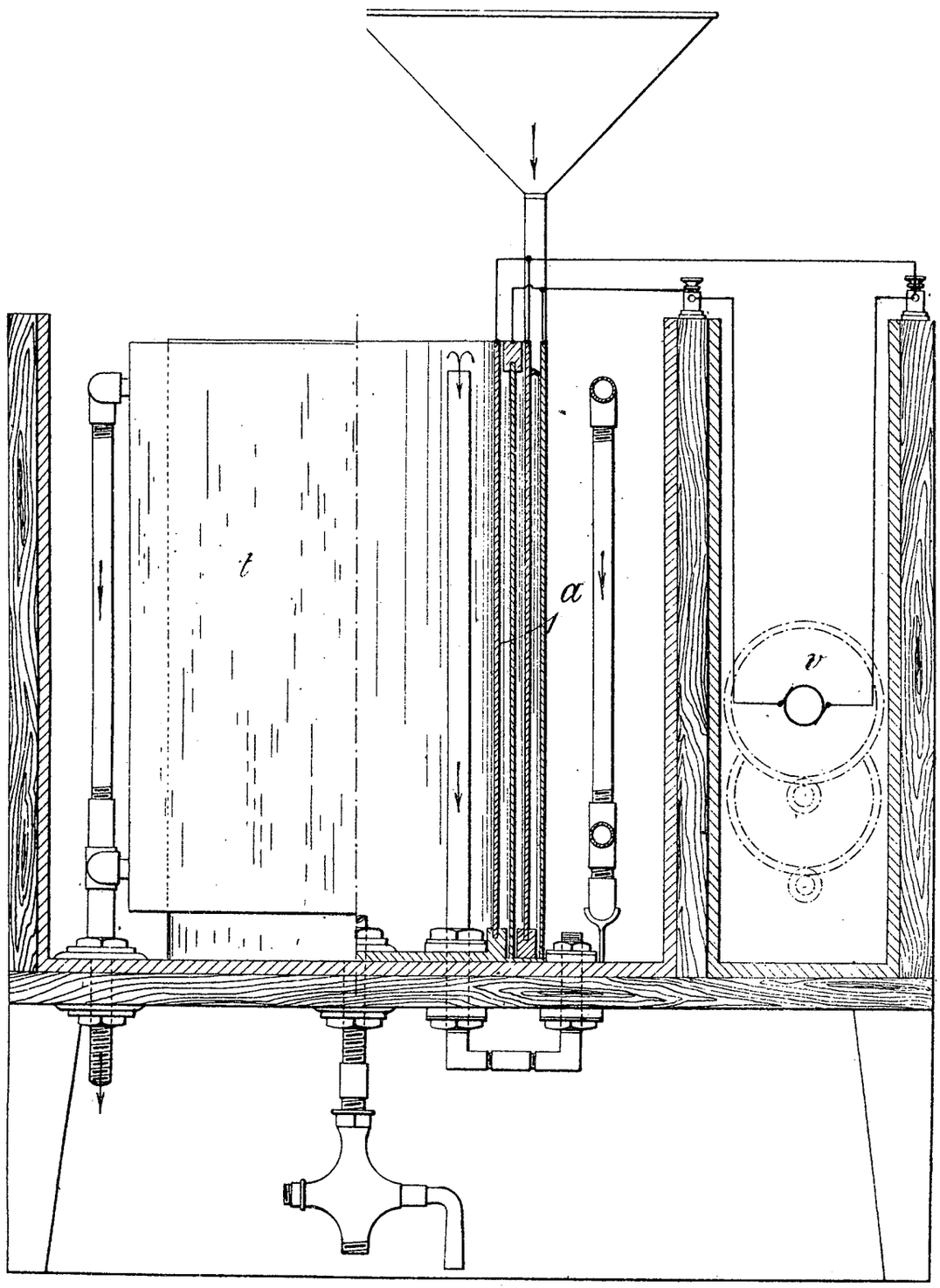


Fig.5.

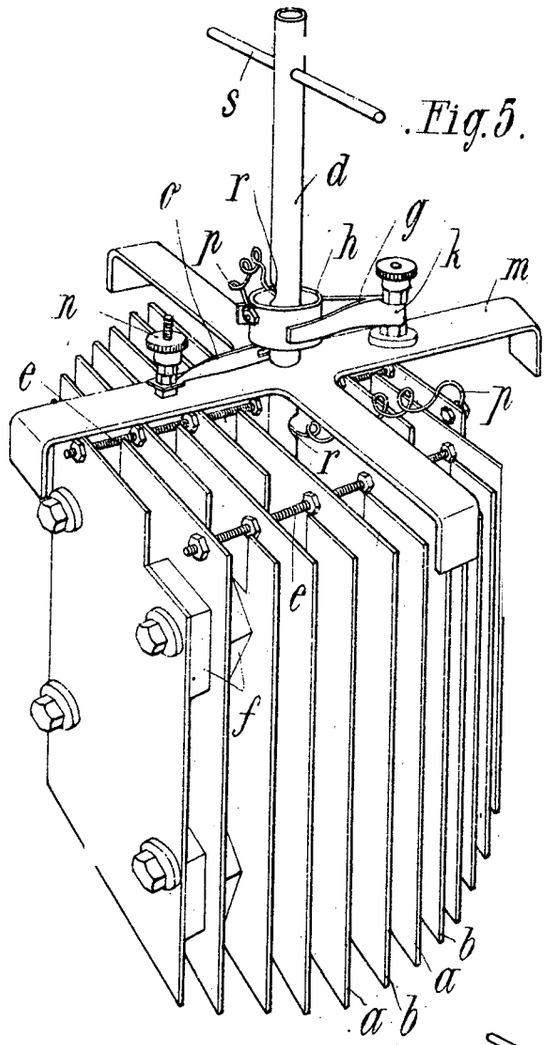


Fig.6.

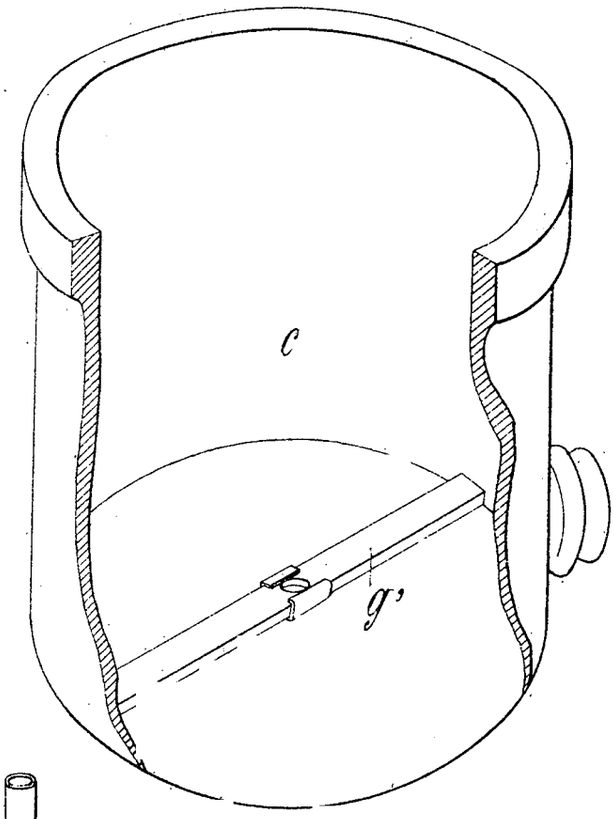
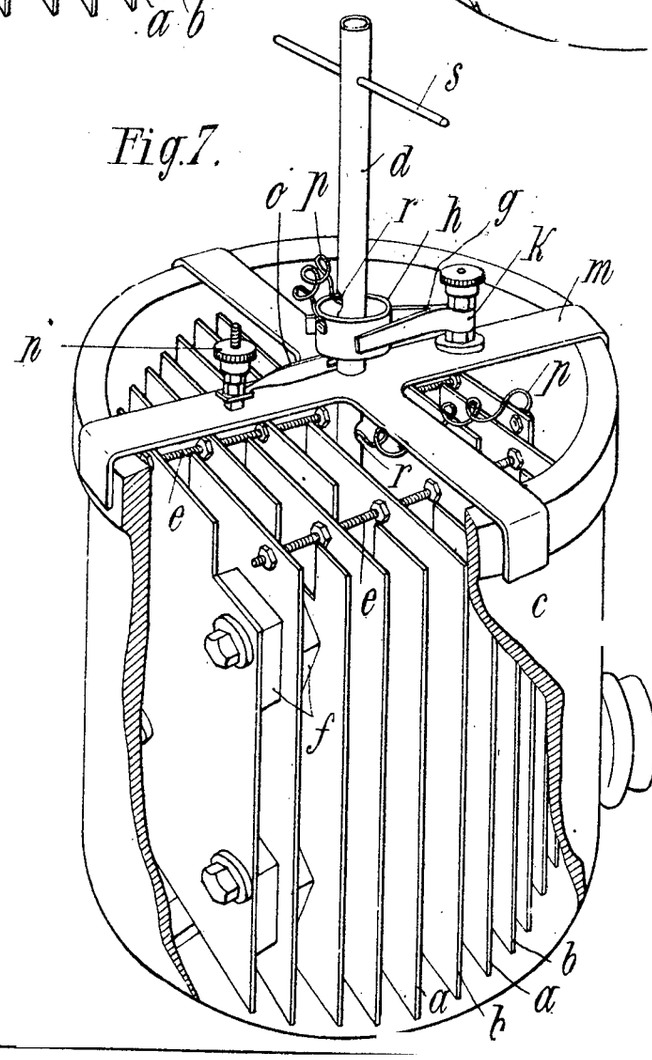


Fig.7.



GOVERNMENT OF INDIA.

THE PATENT OFFICE,

1, COUNCIL HOUSE STREET, CALCUTTA.

SPECIFICATION

No. 2. 2nd January 1912.

(NOTE.—*The application for a patent for an invention of which this is the specification was accepted on* **5th February 1912.** *The acceptance is advertised in the next issue of the "Gazette of India." Within three months from the date of the advertisement, notice of opposition to the grant of the patent may be given under § 9 of the Indian Patents and Designs Act, 1911, and Rule 14 of the Indian Patents and Designs Rules, 1912.*)

IMPROVEMENTS IN ELECTRIC LIGHTING, HEATING AND VENTILATING SYSTEMS, MORE ESPECIALLY FOR RAILWAY VEHICLES.

J. STONE AND COMPANY, LIMITED, OF DEPTFORD, IN THE COUNTY OF KENT, ENGLAND, ENGINEERS.

The following specification particularly describes and ascertains the nature of the invention and the manner in which the same is to be performed.

This invention relates to improvements in electric lighting, heating and ventilating systems, more especially for railway vehicles, and has particular reference to the lighting of block trains, or sets of railway vehicles which are only occasionally broken for the inclusion or removal of one or more vehicles.

One object of the present invention is to so arrange the circuits and the switches on all vehicles that one or more generators on the train may supply, within the safe limit of their output, any desired number of lamps, or lamp and battery installations along the train, so that the inclusion or removal of any coach in or from the train makes no appreciable difference to the lighting of the rest of the train.

These improvements comprise the provision of what may be termed a paralleling main along the whole length of the train, and this main, in the event of several generators being employed, connects all of the positive poles of the generators so that the terminal voltages of the generators are equalized. In combination with such a main, local switches on the coaches are adapted to control resistances appertaining to such switches so that the operation of the switches for lighting or extinguishing lamps simultaneously brings about the adjustment of the resistances for the purposes hereinafter described.

According to the present improvements, known systems of electro-magnetic control may be applied to block train lighting as above set forth. For example, the magnetic control devices described in our prior British Patent Specification No. 26187 of 1905 may be applied to block trains in which some of the vehicles have generators and storage batteries and others have not.

In order to enable this invention to be readily understood reference is made to the accompanying drawings in which—

Figure 1 is a diagram of the wiring of an improved installation in which one coach of a train may be provided with a dynamo and batteries or certain coaches may be so provided and intermediate coaches are fitted with batteries only.

Price: EIGHT ANNAS.

Figure 2 is a diagram of the wiring of another improved electrical system upon a train, some of the coaches of which have generative installations, others of which have only storage installations, and others have only lamp circuits, or may have only connecting wires and no lamps.

Figure 3 is a diagram of the wiring for a coach adapted to be included in a train upon which several generators are connected in parallel by a special main as described, the wiring also comprising a pair of line wires for connecting up switch-controlling electro-magnets.

Figure 4 is a diagram of the wiring for a train, this diagram showing the combination, with a system comprising a main connecting the several generators in parallel, of line wires for connecting electro-magnetically controlled switches for producing different lighting effects according to the operation of certain control switches, and

Figure 5 shows a slight modification of the arrangement seen in figure 4.

Similar reference characters refer to similar or corresponding parts throughout the drawings.

In the accompanying drawings *a* is the positive main which is carried along the train and to which the positive terminals of the dynamo or dynamos are connected : *b* is the negative main and is indicated by dotted lines running throughout the length of the train of coaches *c*. In figure 1 the coach at the left hand end of the train of coaches *c* is fitted with a dynamo *d* which is driven in any suitable manner and with two batteries *e f* which are connected to respective terminals e^1 f^1 of a switch *g*. A resistance *h* is connected between the positive terminal of the dynamo *d* and a connection *j* from the lighting terminal l^1, which latter may be connected by the switch l^2 with the lead *l* connecting all of the postive terminals of the lamps on the coach. The leads *l* may be connected all along the train if desired so as to constitute a third main. The connection *k* from the positive terminal of the dynamo to the positive main *a* is connected by a branch with the positive terminal d^1 on the switch *g*. The brushes or movable contacts *m* of the switch *g* are indicated by dotted lines, and the switch may be turned step by step in one direction only by suitable mechanism operating at suitable intervals. In the position shown the battery *f* is connected direct to the dynamo terminal and the battery *e* to the lighting terminal l^1, to which the dynamo also is connected through the resistance *h*, so that the dynamo *d*, supplies the lamps, when the lamp switch l^2 is closed, with a reduced voltage, and the battery *e* sometimes gives out a little current to assist the dynamo and sometimes receives a little current through the resistance *h*. If the dynamo *d* ceases to generate, the batteries supply the lamps. By moving the brushes *m* through ninety degrees the brushes will connect the battery *e* to the dynamo terminal d^1 and the battery *f* to the lighting terminal l^1. Upon each intermediate coach the lead *l* is connected through a resistance *h* with an outer switch contact *n*, the positive or paralleling main *a* is connected to outer contacts *o p*, and the battery *o* is connected to outer and inner switch contacts *r s*. The lead *l* is also connected to an inner contact *t* by a wire *u*. There are two brushes *v* and *w* fixed at right angles to one another, the long brush *v* being adapted to make contact only between diametrically opposite members of the outer ring of contacts *n o p r*, and the short brush *w* being adapted to make contact only between the inner contacts *s t*. In the position of the switch brushes seen in connection with the coach next to the end coach the long brush *v* connects from *p* to *n* and carries current from the positive main to the resistance *h* and so to the lamps, whereas any current from the battery *e* passes through the contact *s*, short brush *w*, contact *t* and wire *u* directly to the lead *l*. If the battery voltage is low or the dynamo voltage is high some current passes from the main *a* to the battery *e* through the resistance *h*, the wire *u* and contacts *t* and *s*. In the position of the switch seen on the coach to the right hand of figure 1 the short brush *w* makes no connection and the lights are out, the long brush *v* connecting across from contact *o* to contact *r*, so that the positive main *a* is connected directly to the battery *e*.

In the modified arrangement shown by the diagram of the wiring in figure 2, both of the end coaches carry dynamos and batteries, while the intermediate coaches are shown fitted with only consuming circuits and a battery, or with only the consuming circuits and no battery. Gas lighted

coaches may be fitted with the electrical mains only, so that although such coach may be inserted into an electrically lighted train, it need not cause the splitting of the electrical installation of the train into two separate parts as the mains carried by such a coach may be used for connecting the mains on the coaches between which it is coupled. There are three mains in this figure, the main *a* being as before a positive main connected directly with the positive poles of the dynamo generators and serving for connecting the dynamos in parallel when several coaches each carrying a dynamo have been coupled up to the train. There is a second positive main *x* however which is at times connected through wires *z* with the terminals *y* on the terminal boards of the dynamos, the terminals *y* having a lower voltage than the terminals y^1 owing to the insertion of the resistance *h* as explained with reference to figure 1 and as is usual. The connection *z* is open, as at 1, when the dynamo is generating sufficient voltage, and is closed when the dynamo voltage falls below a certain minimum owing to reduction of speed. This may be accomplished by fitting a solenoid core 2 with a brush 3, the winding of the solenoid being connected across the brushes of the dynamo. The solenoid may also operate the switch *g* each time that the dynamo voltage rises above or falls below the pre-determined figure as will be readily understood by those versed in the art, and whenever the core 2 falls, the brush 3 bridges the opening in the circuit at 1.

The lamp switches on the end coaches in figure 2 each comprise two contacts 4, 4 connected with two lamp leads or connections *l l*. Opposite these contacts 4 there are two concentric contacts 5 and 6, the former being connected to the main *x* and the latter by wire 7 to the lighting terminal *y*. Thus if a switch bar *v* be turned across the contacts 4, 5 and 6, the lamp leads *l* will be connected not only with the lighting terminal *y*, but also, when the dynamo is not generating sufficient voltage, through the switch 3 and wire *z* with the main *x* running along the train.

A switch contact 8 is connected by wire 12 with the battery *f* and a contact 9 by wire 10 with the battery *e*, while a contact 11 concentric with contact 9 is connected with one terminal of an auxiliary resistance h^1, the opposite terminal of which is connected with the connection 10 running from contact 9 to the battery *e*.

When the long switch bar *v* of the lamp switch is across the contacts 4, 4, 5 and 6, and it connects as aforesaid the lamp leads *l l* with the main *x* and with the lighting terminal *y*, the short bar *w* of that switch connects between contacts 11 and 8, so that while, in the position of the parts shown, the battery *f* is connected by portion of the wire 12, wire 13, switch *g*, wire 14 and wire 7 with the contact 6, the battery *e* is connected by portion of the wire 10, resistance h^1, contact 11, bar *w*, contact 8, and portion of wire 12 with the wire 13 in which any current from the battery *e* joins current flowing from the battery *f*. The connection of both batteries to the lamps and also to the main *x* through the contact 5 is thus apparent. In addition, the battery *e* is connected through a portion of wire 10, switch *g*, wire 15 and portion of wire 7 with the main *a*.

Upon the coach c^1, figure 2, there is neither dynamo nor battery. The contacts 4, 4 of the lamp switch are connected to the lamp leads *l l*, the contact 5 is connected to the main *a* through a resistance h^2, while the contact 6 is connected to the main *x* direct. A contact 141 nearer to the centre of the switch is connected with an intermediate point of the resistance h^2 and the contact 5 is formed with a portion 151 which coincides with the same circle as the contact 141. When the switch bar *v* is in the position shown on the coach c^1, figure 2, the contacts 4, 4 are connected with the contacts 5, 6, while the contact 141 is joined to contact 151 by short bar *w*. Current, therefore, passes from main *a* through part of the resistance h^2 to the contacts 141, 151, 5 and 4 and on to the lamps, while also a direct connection is made to main *x* through contact 6. The contacts 141 and 151 are so arranged that when the bar *v* is turned so as to touch only one of the contacts 4 and connecting same to contacts 5 and 6 for lighting only one-half of the lamps, as in coach c^2, figure 2, the bar *w* does not touch the contacts 141 and 151 and therefore current passes through the whole of the resistance h^2 to the lamps. Also connection is made direct with main *x* through contact

6. It may be advantageous to provide stops for preventing the switch bar v from being turned anti-clockwise beyond a horizontal position and from being turned clockwise beyond the vertical position shown on the coach c^1. As shown in connection with the coach c^2 a battery may be connected between the main a and the negative main b.

In the arrangement illustrated in figures 3 to 5 the dynamo is not seen, as it is sufficient for the purpose of these diagrams to show only the terminal board 16 of the dynamo. In these figures two wires 24, 25 are shown as being carried along the train, and these wires are employed as circuit connections for solenoids or electro-magnets situated at various points along the train and adapted for operating switch arrangements for controlling the respective consuming circuits. The arrangement will now be fully described with reference to figures 4 and 5.

Examples of the electro-magnetically controlled switches are described in the specification of our British Patent 26187 of 1905. Briefly, they may be said to consist each of a winding A and a winding B. The windings A are all connected, for example, to the wire 24, and the windings B are all connected to the wire 25. One or more switches 32 are provided for electrifying either the wire 24, or the wire 25, or both of the wires simultaneously. From this it follows that either all of the windings A or all of the windings B may be simultaneously energized, or all of the windings A and B may be simultaneously energized. The switches which are operated by the cores or armatures in connection with the windings of each magnet or solenoid are so arranged that when, for example, the winding A of any switch is energized, the switch is so operated that full lights are turned on. When both windings A and B are simultaneously energized only half of the lights are turned on, and when the winding B only is energized all of the lights are extinguished. The electro-magnetically operated switches may be so connected with a resistance that the said resistance is automatically varied to suit the different numbers of lamps or the like switched into or out of circuit by such switches.

Now in figures 4 and 5 the electro-magnetically operated switches are not shown as they do not in themselves form part of these improvements. It is sufficient to show the terminal board 31 of such switches. On the two end coaches and on the middle coach control switches 32 are arranged which are provided with contacts so connected that by moving the switch lever of any switch 32 to one position the wire 24 is electrified, by moving it to a second position the wire 25 is electrified, and by moving it to a third position the wires 24 and 25 are simultaneously electrified, so that the windings A or B, or A and B together, will be energized all along the train with the results as above explained.

Let it be assumed that the end coaches are guards' coaches and that the middle coach is a sleeping or dining or first class car, it is frequently desirable that a special attendant upon the latter shall be given sole control of the lighting of that car at certain times. For example, it may be undesirable that the lights in a dining car should be turned on or off by the guards whenever the lights in the third class compartments are so turned on or off by the operation of a guard's switch 32.

To permit of the lights upon such a car being placed either under the control of the guards or exclusively under the control of the attendant upon such car, a double pole switch 33 is arranged in the branch wires 34, 35 leading respectively from the wires 24, 25 to the switch terminal board 31. If this switch 33 is closed, then the operation of a switch 32 at either end of the train will control the lights upon the middle car in the same manner as they are controlled upon the other coaches of the train. If, however, the switch 33 is opened, the control of the lights on the middle car is removed from the general control by the guards and is exclusively under the control of the attendant upon the middle car, who is able, by the switch 32 on that car, to control the lights on the middle car only according to the particular requirements of the middle car. It will be noted, however, that whether the lights of the car be subject to the general control or the local control, the connection 26 between the dynamo terminal on the middle car and the paralleling main a is permanent and remains unaffected by the particular control which is in operation

The arrangement shown in figure 5 is very similar to that shown in figure 4, the only difference being that in figure 5 a magnetic change-over switch *g* is diagrammatically indicated and suitable connections therefor are shown.

The coach shown in figure 3 has any ordinary or convenient lamp switch 28 and no electro-magnetic control. It is, however, fitted with wires 24, 25 to enable it to be inserted in a train of coaches having magnetic control as shown in figures 4 and 5.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, we declare that what we claim is :—

1. In a system of electric lighting for train sets comprising one or more coaches fitted with a generative installation and other coaches fitted only with a lighting installation and storage batteries, or only with a lighting installation, the arrangement of a main along the train to which the generator is directly connected or to which the several generators are so connected in parallel, and the provision upon such other coaches of a switch and resistance, the switch comprising two sets of contacts so arranged that when the switch is set for putting the lamps in circuit the current passes from the paralleling main through the resistance to the lamps and from another source of current direct to the lamps, substantially as described.

2. In a system of electric lighting for train sets as claimed in claim 1, the arrangement according to which a switch which is opened for cutting the lamps out of circuit simultaneously connects a battery directly to the positive or paralleling main, substantially as described.

3. In a system of electric lighting for train sets as claimed in claim 1, the arrangement in combination of electro-magnetically operated switches on certain of the coaches for controlling the lighting circuits thereon, controlling switches at different points of the train connected with the windings of the electro-magnetically operated switches so that any controlling switch controls all of the electro-magnetically operated switches, and a cut-out or switch on any vehicle fitted with an electro-magnetically operated switch, such cut-out or switch being adapted to remove the windings of the corresponding electro-magnetically operated switch from the general control effected by other controlling switches, substantially as described.

4. The arrangement of switch and resistance and connections therefor upon a coach not fitted with a generative installation, said coach being adapted for inclusion in a train set comprising a coach or coaches fitted with a generative installation, or with generative installations, substantially as described with reference to figures 1 and 2 of the accompanying drawings.

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HENRY W. LEE,
Secretary.

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FIG. 1.

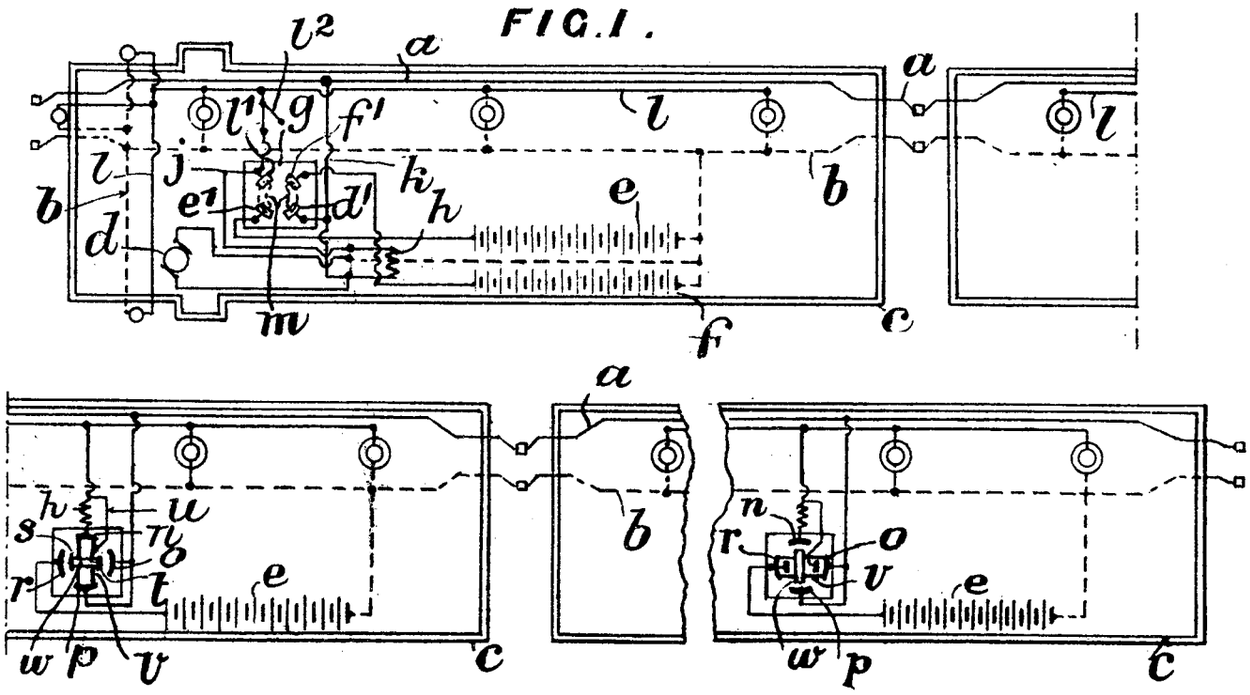
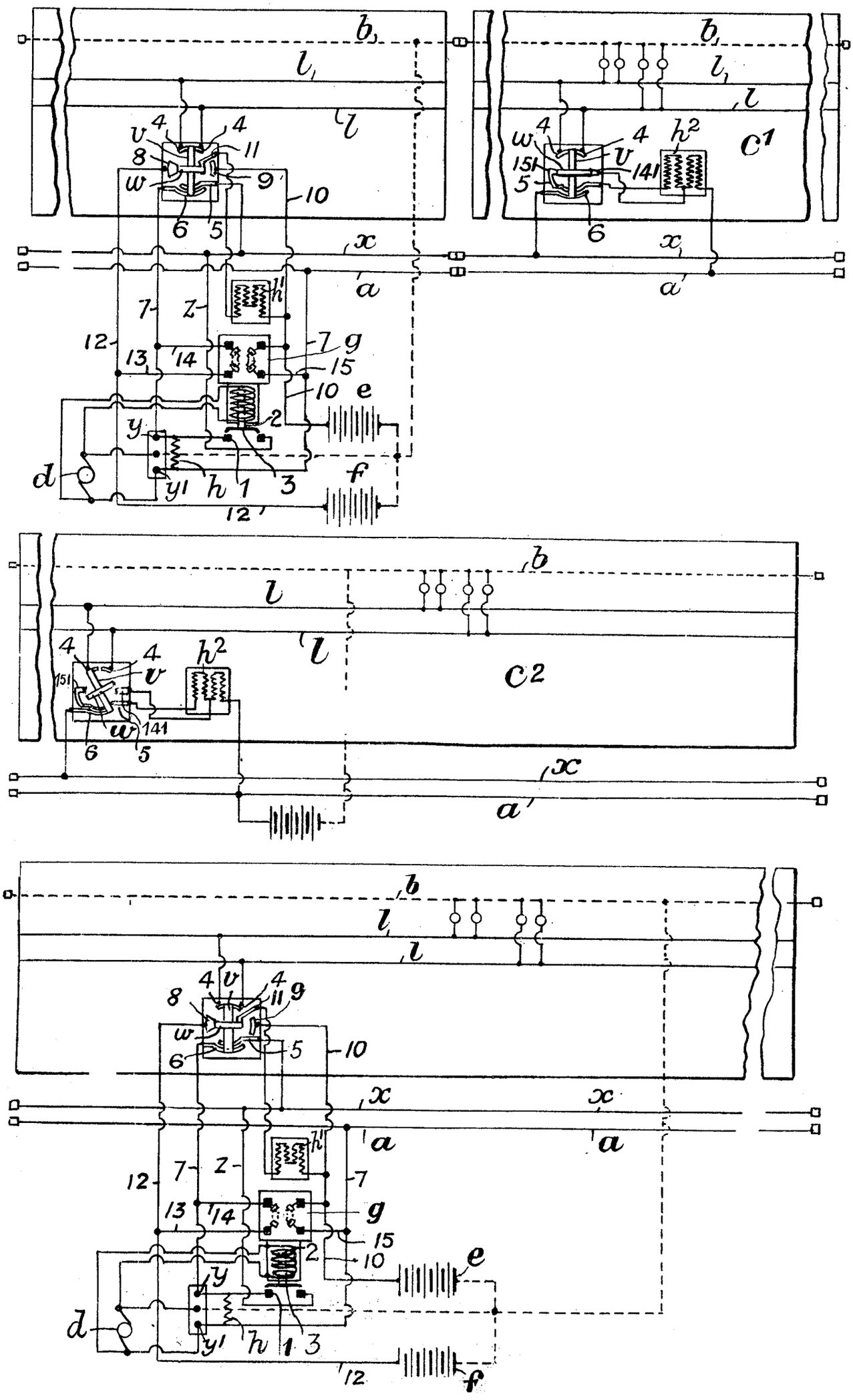


FIG. 2.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C1
h2
151
141
C2

FIG. 3.

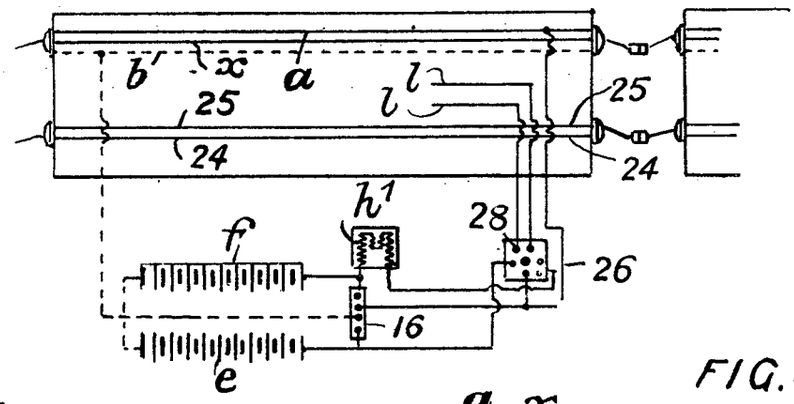
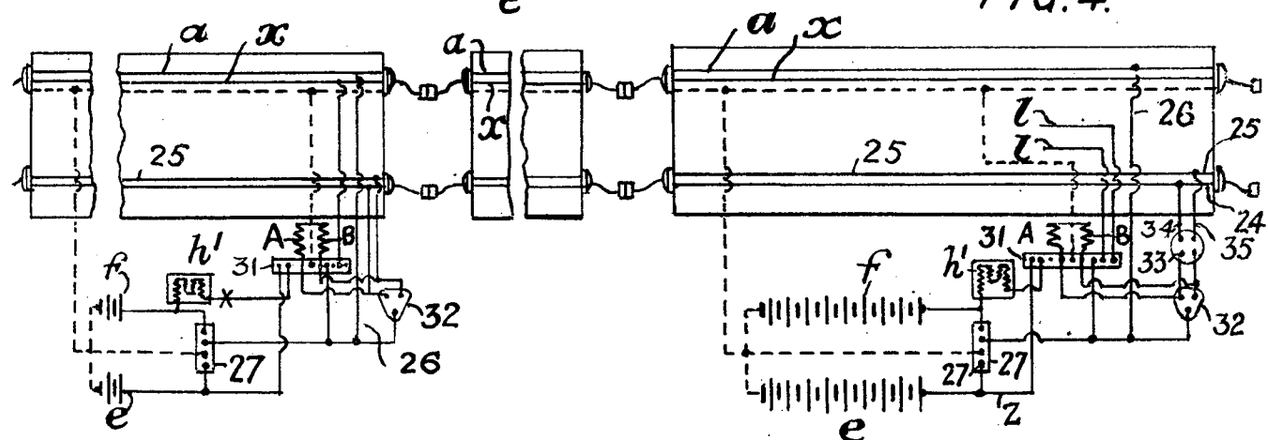


FIG. 4.



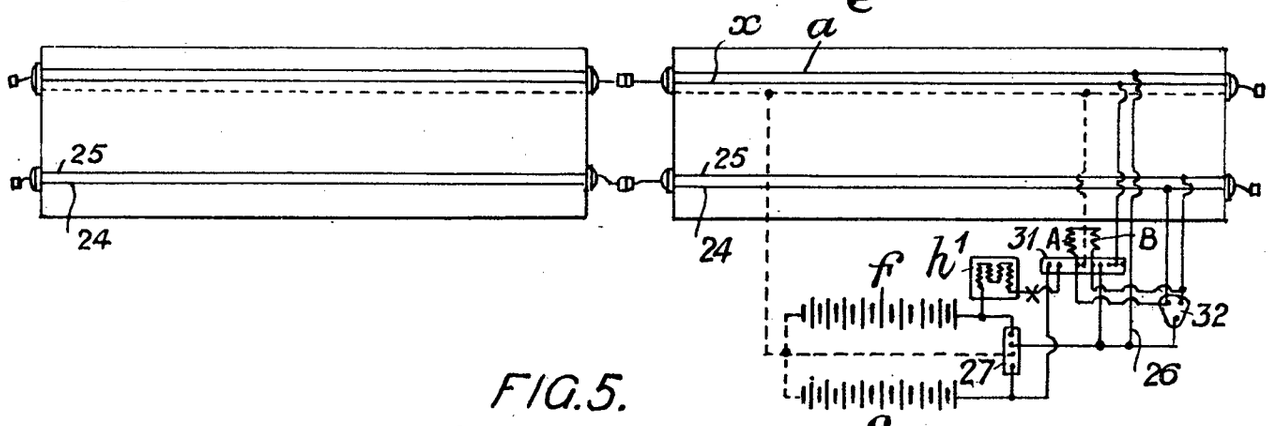
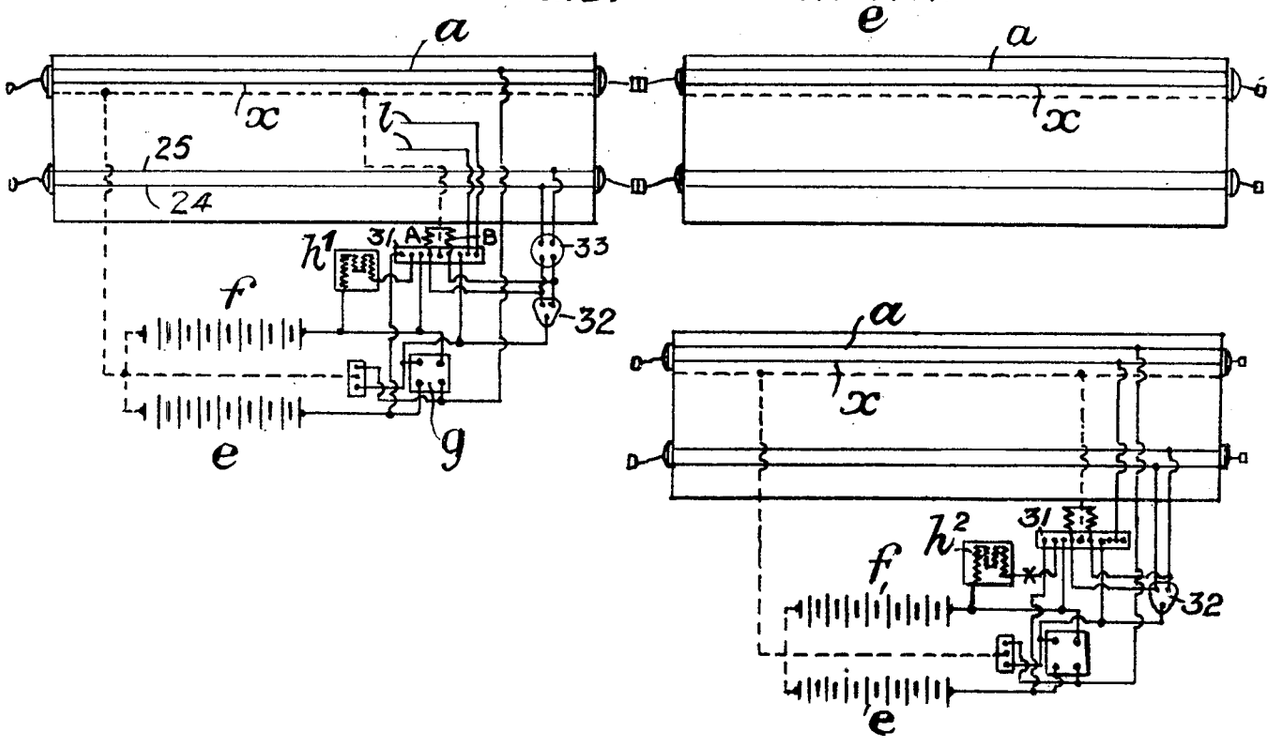


FIG. 5.



GOVERNMENT OF INDIA.

THE PATENT OFFICE,

1, COUNCIL HOUSE STREET, CALCUTTA.

SPECIFICATION

No. 3. 2nd January 1912.

(NOTE.—*The application for a patent for an invention of which this is the specification was accepted on* **5th February 1912.** *The acceptance is advertised in the next issue of the* "Gazette of India." *Within three months from the date of the advertisement; notice of opposition to the grant of the patent may be given under § 9 of the Indian Patents and Designs Act, 1911, and Rule 14 of the Indian Patents and Designs Rules, 1912.*)

IMPROVEMENTS IN OR RELATING TO RUBBER TYRES AND THEIR ATTACHMENT TO WHEELS.

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The following specification particularly describes and ascertains the nature of the invention and the manner in which the same is to be performed.

This invention refers to the construction of rubber and such like tyres and the mechanical attachment of same easily, rapidly, and securely to wheels, one special feature being that although the air may be confined in the tyre, said tyre does not require to be pumped to a high pressure, the confined air being used at a low pressure. In fact atmospheric pressure may be used under many conditions without the tyre collapsing or bursting and without the side walls cracking under load.

It has been proved that if existing tube pneumatic tyres could only be constructed to efficiently carry the required loads, and if the outer cover of each tyre could only be held securely to the wheels bonding rim, under suitable compression, without having to pump the air to say 70 or 80 lbs. per square inch, said tyres would be more resilient and would absorb road shocks better than at present, even if said air pressure was only inflated to say one-half, one-third, or less ; but with tube tyres constructed as at present ; such low pressures are impossible, combined with long mileage and efficiency, and one of the principal features of this invention is the construction of a confined air tyre which is capable of carrying the required loads, without the body of the tyre disintegrating or separating or the side walls cracking, the base of which tyre is also capable of always being held securely under uniform compression and without creeping to the outwardly flanged bonding rim of a wheel, even at very low air pressures. In fact in many cases the air density need not be greater than atmospheric pressure.

The construction and attachment of existing tube pneumatic tyres for motor chassis wheels makes it impossible for them to carry their loads efficiently unless the air pressure or density is high, say 50 to 80 lbs. per square inch, but with my invention I am able to carry similar loads at low air pressures efficiently, my tyre being automatically sensitive to carry varying loads without risk of said very resilient tyre being deflated, collapsing, bursting or

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leaving its outwardly flanged rim, and this is accomplished by means of the new construction of a tyre preferably manufactured without either fabric or metal, in combination with the new attachment of same to a wheel, enabling the tyre's base to be always fitted under uniform compression to the wheel, and enabling a detachable single puncture proof tube tyre to be constructed without porosity being mechanically formed, attached, sealed and locked to a wheel to carry the required loads when using very low air pressures.

In order that my invention may be properly understood and readily carried into effect I have hereunto appended four sheets of drawings, of which—

Figure 1 is a vertical section of a tyre rim felloe and spoke.

Figure 2 is a similar view showing the tyre depression in ground contact.

Figure 3 is a further similar view showing the tyre under additional pressure in ground contact.

Figure 4 is a sectional view of the detachable outside flange of the bonding rim.

Figure 5 is a sectional view of part of a wheel with felloe spoke and bonding rim with detachable outside flange shown in position in dotted lines.

Figure 6 is a sectional view of the retaining rim designed to fit inside the pneumatic chamber of rubber tyre.

Figure 7 is a perspective view of a tyre with the bonding rim and retaining rims removed.

Figure 8 is a cross-sectional view of a tyre with retaining rim or ring in position.

Figure 9 is a cross-sectional view of a tyre with rims in position not locked to a wheel.

Figure 10 is a view of a tyre with an extra bead and double pneumatic chambers with bonding and retaining rims and bolts fitted as in the tyre of the beforementioned figures locked in position.

Figure 11 is a view of a beaded tyre with a modified form of retaining rim and bonding rim and bolt bead not locked in position.

Figure 12 is a view of a further modified form of tyre and rims locked in position.

Figures 13 and 14 are elevations illustrating different forms of the retaining bolt, all hereafter more fully referred to and described.

This pneumatic tyre is in some respects slightly similar in its base construction to a pneumatic tube cover, and like the cover of a pneumatic tube tyre it may have two beads, A^1 and A^2, see figure 7, which two suitable beads may be attached and rigidly held in a fixed position under uniform compression to a suitable outwardly flanged circumferentially divided rim of a wheel by the simple operation of turning half-round suitable fixed bolts D, see figures 11, 12 and 13, or by using other suitable nuts E^1, and bolts E, see figures 1, 2, 3, 9, 10 and 14, or in fact by any suitable known bolt and nut or clamp attachment.

The two retaining spewable beads A^1 A^2 are therefore not held in position or to the rim by means of great air pressure inside the tyre, but by means of my suitable mechanical combination attachment device, which device prevents the tyre beads being wrenched or pulled away from the outwardly flanged bonding rim, under any conditions or circumstances, and this attachment device with its metal fastenings also enables a mechanically made self-sealing confined air chamber A^8 to be obtained internally all round my tyre, see figures 1, 2, 3, 9, 10, 11 and 12.

The two large tyre beads A^1 A^2 may be held in their fixed position by using a suitable tyre retaining preferably endless keying rim F, see figure 6, indistortable laterally or the rim may be constructed from an endless truly circular inwardly flanged metal rim having say wood filling suitably inserted between its two inward flanges F^6 of rim F^1, said two inward flanges F^6 being pressed home against the inward sloping sides of the wood filling until the metal inward flanges themselves lie against the wooden sides and become inward sloping flanges, see figures 8 and 9, or any other suitable light keying retaining endless rims F^2, F^3 or F^4, see figures 10, 11 and 12, may be used, provided they are indistortable laterally and enable the pronounced spewable toes A^3 A^4 of the beads A^1 A^2 to be spewed and keyed in position between two suitable endless metal rims forming a mechanically made self-sealing air chamber

inside the tyre by simply fitting the tyre over its wheel, see figures 9 and 11. This retaining rim F, F^1, F^2, F^3 or F^4 is capable of being easily and rapidly fitted inside my rubber tyre A, and made to lie snugly between the two rubber beads A^1 and A^2 of my tyre base, being floated over the spewable long toes A^3 and A^4 of the beads, see figures 1, 2, 3, 8, 9, 10, 11 and 12, filling up the space H between the spewable rubber beads A^1 and A^2 and, when possible, having a width preferably the same or greater than the narrowest part at the treading circumference of the tyre, see figures 1, 2, 3, 8 and 9.

The retaining rubber beads A^1 and A^2 of this tyre A, see figure 7, are preferably much thicker, heavier, and different in construction to the beads of an existing tube pneumatic tyre cover having pronounced hooking heels A^5 and A^6 and pronounced spewable and keyable toes A^3 and A^4, and having preferably no fabric in their construction, and on the extreme outside edges of my two base beads A^1 and A^2 I may have moulded say round rubber knobs A^7 and A^8 half inch to five-eighths of an inch wide in diameter, which rubber knobs A^7 A^8, see figure 8, may be moulded all round the two extreme outside heel edges, said retaining knobs being moulded at suitable distance apart from each other and these retaining rubber knobs may be made to pass through corresponding round holes K^7 and K^8 formed in the right and left hooking flanges K^3 and K^5 of my bonding rim K, see figures 9, 10, 11, 12 and 8, which two flanges may extend outwards preferably $1\frac{1}{2}''$, the first $1''$ may be at right, obtuse, or acute angles to the cross-section of the circumference of the wheel having the remaining extreme outside $\frac{1}{2}''$ of each rim say sloping or curled inwards towards each other, each forming a hook which catches a corresponding heel hook on the tyre so that the heel cannot be disengaged or lifted from its hooked or keyed position, see figures 1, 2, 3, 5, 9, 10 and 11.

The bonding rim K is divided circumferentially into two endless circular rims or parts K^1 K^2 and the inside rim or parts K^1 may be fixed and attached rigidly to the felloes L, of the wheel M, having one suitable hooking outward flange K^3, and one suitable inward flange K^4, see figure 4.

The detachable outside flange part K^2 of the bonding rim of wheel, being constructed having a deep channel K^8 in its cross section with deep flanges at each edge, see figure 4, has enormous lateral strength, and may be constructed having a suitable hooking outward flange K^5, but the inner flange K^6 of this detachable rim K^2 not only extends suitably inward, but is made to fit inside the wheels say wooden felloes L, thereby enabling the deep channel rim with its deep inner guiding and keying flange to be easily guided and keyed into its correct position by the inner circumference of the wheel's felloe, see figures 4 and 5, so that when the two flanged rim parts of the bonding rim K are in position the fixed part of the bonding rim K^1 may be fitted rigidly over the felloes L, and the detachable flanged part K^2 fitted and attached inside the felloes L, see figure 5, the two rims K^1 and K^2 of the bonding rim K being then drawn together laterally by means of say six or more suitable screw bolts E and nuts E^1, the stems E^2 of which bolts pass suitably first through the two inward and preferably inward sloping flanges or sides K^2 and K^4 which lie close together side by side and then through the felloes L, thereby holding the indistortable detachable light flanged part K^2 securely and tightly to the fixed flanged part K^1 and to the wheel, without any possible chance of detachment taking place except when detachment may be required, and without metal having to be tightly fitted over metal or having the detachable part K^2 of the wheel's bonding rim K depending absolutely on the stems of the tightening up bolts for support on the wheel laterally, see figures 1, 2, 3, 4, 5, 10, 11 and 12.

When the two retaining base beads A^1 and A^2 of my tyre A with their pronounced continuous hooking heels A^5 A^6 and toes A^3 A^4 are suitably fitted, hooked, and mechanically locked under uniform compression in position between my endless keying tyre retaining rim F, and the two hooking perforated flanges with or without the rubber knobs A^7 A^8 formed on each bead's outer edge or heel protruding through the round holes K^7 K^8 in the flanges it is absolutely impossible for the spewable beads, under any conditions, to be wrenched, twisted, or dragged from the bonding rim, or wheel's circumference.

This device or means of mechanically attaching and detaching pneumatic or cushion or solid rubber tyres to and from a wheel is very easy to operate

and possesses immense strength, especially to meet all lateral stresses. It is absolutely water-tight, is simple and durable, and is not affected by rust, mud, or dust, and under every possible condition it holds the tyre securely to the bonding rim besides being light in weight, and everywhere the base beads A^1 A^2 are fitted, keyed, spewed and locked under compression to the metal fastenings or walls against which the compressed beads lie making the required locked mechanically formed self-sealing air-tight chamber A^8 inside the tyre A by say turning half round tightening up clamp bolts or screwing up the nuts on their bolts, enabling the rubber at the base of the tyre to be spewed continuously all round the base beads A^1 A^2 of the tyre A, after the tyre is once correctly fitted or refitted in position to the wheel, see figures 1, 2, 3, 9, 10, 11 and 12.

Although the attachment bolts E and nuts E^1 (or other suitable bolts and nuts), which are automatically locked in position, securely hold the detachable flanged rim K^2 to the fixed flanged rim K^1, this detachable rim part may also, if required, be independently locked in position by passing suitable screws or screw bolts K^9 through its internal flanged circumference K^6 into the inner circumference of say the wooden felloes L, against which it lies, see figures 10 and 12.

The construction of the other part of my pneumatic tyre A may be quite different from existing pneumatic outer covers, being preferably manufactured fabricless and homogeneous without porosity, and the internal shape of the outer circumference of my air chamber A^8, in its section, instead of being circular or arch-shaped or of horse-shoe formation like existing tube tyres, is preferably gable-like or triangular in shape to enable the rubber to spew internally under load. The keying retaining endless air-tight metal rim fitted and embedded in position inside the tyre A between the beads enables the toes A^3 and A^4 of the beads A^1 and A^2 to be jammed between the extreme inner metal circumference of the keying retaining rim and the channel bed of the bonding rim K of the wheel by simply fitting the tyre over the wheel, see figures 9 and 11, and 1, 2 and 3.

The thickness of the narrowest part of the rubber walls at the top of the retaining hooking heels of the beads A^1 A^2 may be say $\frac{3}{4}''$, which may be greatly increased as the beads extend inwards and the two internal sides or walls A^9 A^{10} of the air chamber A^8 may gradually also increase in thickness as the walls extend outwards before they finally meet together, forming the say triangular or gable-like air chamber A^8 in the cross-section of the tyre, see figures 7 and 8. The entire sectional height of my tyre from extreme outer narrow circumference to inside of wide base may be say 3″ to 4″ having an entire width of base excluding the round bead knobs but including the internally fitted retaining endless ring of say $4\frac{1}{2}''$ or 5″ which wide base gives the tyre when attached great lateral stability with say a width at treading circumference A^{11} of the tyre of say 2″ to 3″, so as to form a narrow cutting treading circumference which flattens much against the road surface circumferentially under load but little laterally, thus constructing a very resilient and natural non-skid tyre preferably having here when possible the same or less width than the extreme width of the detachable retaining floating metal endless rim F, see figures 6, 1, 2 and 3, and the thickness of rubber between the extreme outer treading circumference of the tyre and the confined air chamber A^8 may be say $1\frac{1}{4}''$, and I preferably mould the outer narrow treading circumference A^{11} of my tyre in suitable sections or shapes with cutting edges to prevent skidding and slipping, or may use any suitable non-skidding or non-slipping detachable metal chain O, or other non-skid device on the tyre's circumference, see figures 7, 8, 9, 10, 11 and 12.

Immediately the detachable flanged part K^2 of my bonding rim is fitted, drawn, and finally locked to the wheel by means of my six or more suitable bolts and nuts, the tyre is made water-tight and the whole of the base of my tyre (including the right and left beads of the tyre and the round retaining knobs moulded thereon, and the internally fitted endless tyre retaining rim) is jammed everywhere under suitable compression round the circumference of the metal bed of the bonding rim K of the wheel, making an air-tight locked chamber or tube A^8 all round the tyre without requiring any additional jointing material between the spewing beads A^1 A^2 and the steel walls which surround the beads, there being in this tyre attachment device no such thing as a

frictional contact bearing surface anywhere on the spewing base A^1 A^2 of the tyre A, and creeping does not take place between the base of my tyre and any of the steel walls against which the rubber is mechanically hooked, keyed, spewed, and finally locked in position, and I may mould round the right and left sides of my tyre above the continuous hooking heels A^5 A^6 suitable circular flange protecting rubber beads A^{12} and A^{13} which beads may be moulded about half way between the extreme inner base and the extreme outer treading circumference. These right and left protecting beads protect the outward hooking steel flanges of my bonding rim K, say against kerb and road shocks, see figures 1, 2, 3, 9, 10, 11 and 12.

Although I preferably construct the tyre endless in one homogeneous non-porous tough piece of rubber, this tyre may be constructed broken, or from a number of suitable sections, which sections may be easily, rapidly and securely attached by means of my combination attachment which hooks and keys the toes of the beads continuously under compression round the base of the tyre to the bonding rim of the wheel, without any risk of said sections pulling away from the bonding rim under wear and tear, but when sections are used I cannot get the same resiliency in the tyre unless the air is suitably confined by say using an inner air tube and valve, and when sections are used I prefer moulding at least one rubber knob on each end of each section on their base bead heel edges to prevent the section ever leaving its engaged hooked and locked position on the wheel's bonding rim under wear and tear.

This tyre is constructed of such a shape and preferably without fabric so as to enable the rubber in the tread A^{11} and walls A^9 and A^{10} to contract and flow or spew internally, thereby giving rapidity of movement to the rubber, enabling the rubber to return quickly to its original shape and causing the rubber in the tread A^{11} to be under compression instead of under stretch when carrying a load, and the peculiar formation and strength of the giving contracting non-cracking rubber walls which are automatically thickened under varying loads, see bottom of figures 2 and 3, enables low air pressure to be efficiently used in a large confined air space or chamber moulded inside the tyre, there being preferably no layers of fabric in the body of the tyre to separate or cause disintegration under wear and tear.

It is to be specially noted that the spewable rubber beads A^1 A^2 make many uniform perfect air-tight joints all round the circumference of each bead laterally and circumferentially, without requiring any additional jointing material when the retaining metal rim floated inside the tyre is manufactured endless and air-tight. Also that this invention enables a rubber tyre to be rigidly attached, under great uniform base compression over a wheel after the tyre has been easily fitted in position over the wheel without having metal manufactured in the tyre and without passing metal through any part of the rubber.

When this attachment device is used the base of a rubber tyre may be fixed and held tightly to the suitable steel bonding rim K, of a wheel, having the required uniform compression everywhere on its compressed base bead A^1 A^2 all round the wheel, enabling the tyre A to have much greater power of re-bound from a blow or road shock than it could possibly have if its base was not attached under uniform compression.

With this tyre I may use any suitable form of air valve (or any suitable air tube) to get greater internal air pressures than atmospheric pressure, when required.

The tyre A may be constructed with more than two spewable beads formed on the base of each tyre, the middle base bead A^{14}, see figure 10, the beads being constructed having long spewable toes A^{15} A^{16}, capable of being keyed and locked in position under great compression, against the bed of the circumferentially divided bonding rim by suitable detachable endless retaining rims F^2 floated internally on the toes A^{15} A^{16}.

The tyre A, see figure 7, and its retaining rim F, see figure 6 and the circumferentially divided bonding rim K of wheel, see figures 4 and 5, or any of the attachment parts may be constructed in suitable shapes and dimensions, and of suitable materials, and by using this invention the outer rubber and fabric cover of a pneumatic tyre may be suitably manufactured to be used with or without an inner air tube and attached to a wheel having it

base beads constructed larger and spewable with very pronounced spewable extended toes, capable of being easily jammed between two endless air-tight metal rims to enable the outer cover to form by itself by means of its spewable toes when locked to the bed of the wheel's bonding rim a mechanically formed self-sealing air chamber within the tyre independent of an inner air-tight air tube, and at the same time to obtain a mechanical attachment under compression between the base beads of the tyre and the circumferentially divided bonding rim of the wheel, which attachment also prevents the rubber and fabric cover ever blowing off the wheel or creeping on the rim of wheel, or the large spewable toes of the beads ever leaving the bed of the bonding rim even if the cover bursts or is deflated.

When using a pneumatic rubber and fabric cover with an inner air tube, the air tube is first fitted inside its outer cover, and then the endless retaining rim is fitted inside the cover, being floated on the spewable long toes of the beads before the tyre is easily fitted over the wheel, the tyre base being finally locked in position by means of this attachment.

With this attachment a continuous air-tight chamber may be obtained when using an inner air tube inside a suitable pneumatic rubber and fabric cover, which may be sealed in two distinct and separate ways, one by the air tube and valve and the other mechanically by my base construction and attachment, so that two independent seals require to be broken or destroyed before the compressed air can escape from the tyre unless said tyre is punctured or burst.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is :—

1. A pneumatic or cushion tyre having an air chamber constructed in cross-section of such a shape that the walls automatically thicken and spew internally with increase of load substantially as described.

2. A pneumatic or cushion tyre having a mechanically formed air-tight chamber constructed in cross-section of such a shape that the walls automatically thicken and spew internally with increase of load substantially as described.

3. A pneumatic or cushion tyre having one or more air-tight chambers constructed of gable-like or triangular cross-section whereby the walls automatically thicken and spew internally with increase of load substantially as described.

4. A pneumatic or cushion tyre having an air-tight joint constructed and operating substantially as described.

5. Securing a pneumatic or cushion tyre to a wheel or rim by joints substantially as described.

6. In a pneumatic or cushion tyre constructing the base of the tyre in the form of spewable rubber base beads having extended toes and capable of forming under mechanical compression continuous air-tight joints, by securely holding the beads to a suitable bonding rim or wheel under compression by means of mechanical fastenings substantially as described.

7. A pneumatic or cushion tyre constructed and operated substantially as described and illustrated.

EDWARD BRICE KILLEN.

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E. B. HILLEN. 3/1912. (4 Sheets). Sheet No. 1.

Fig. 1.

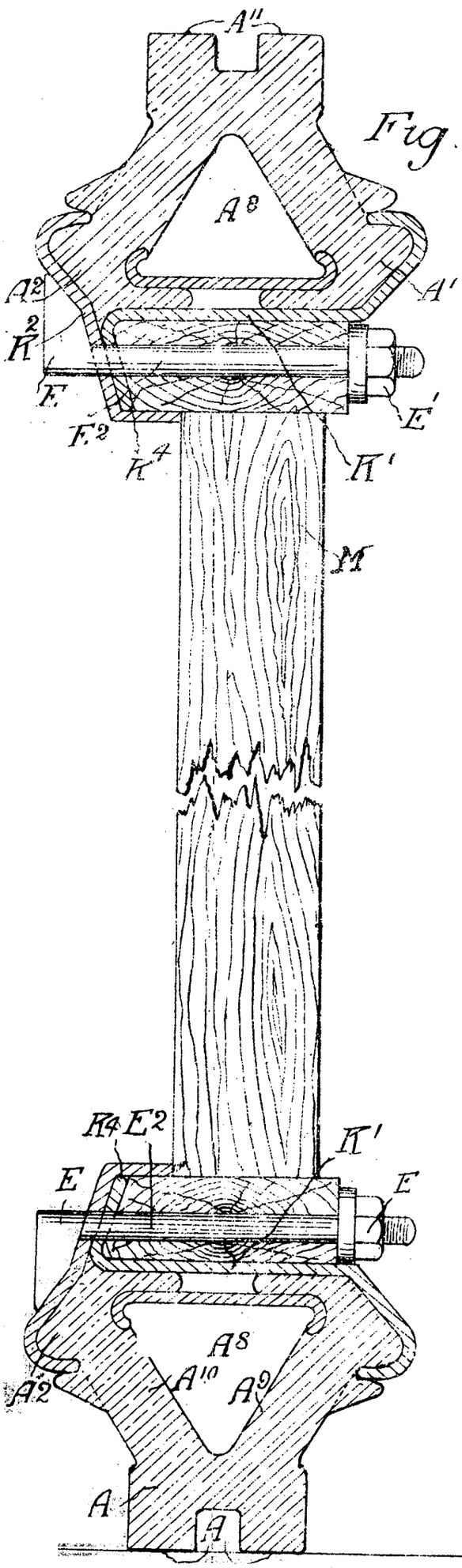

Fig 2

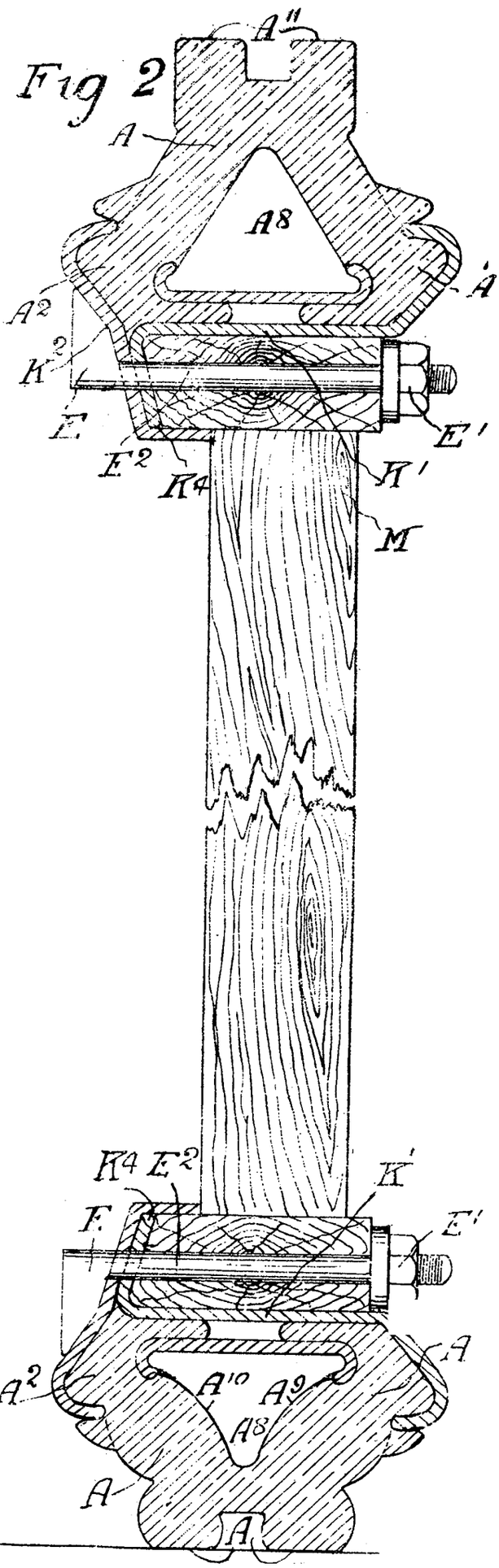

Fig 3

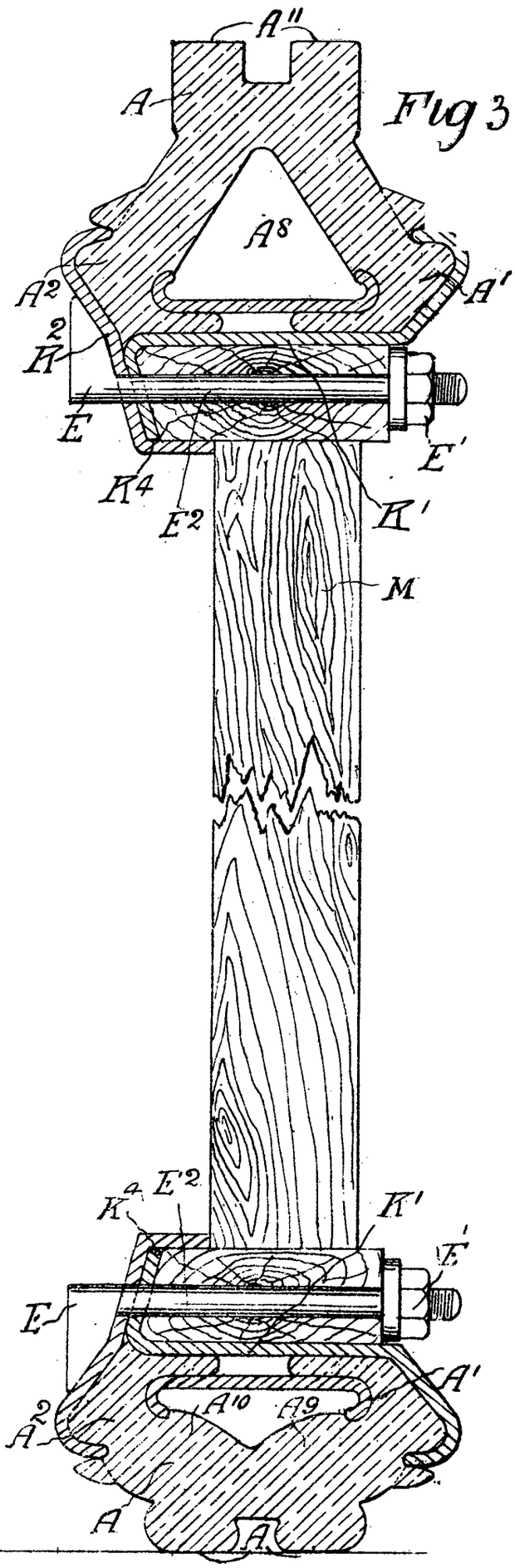

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Fig 4.

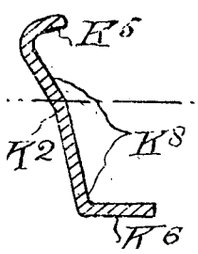


Fig 5

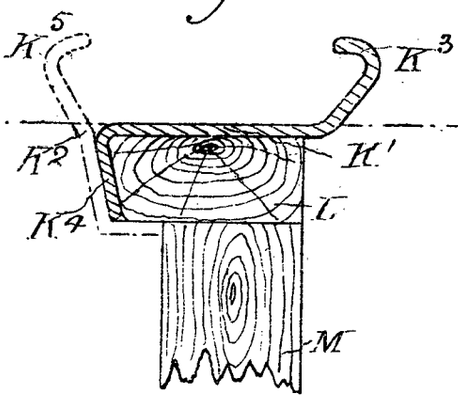


Fig 6

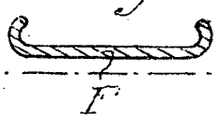


Fig 9

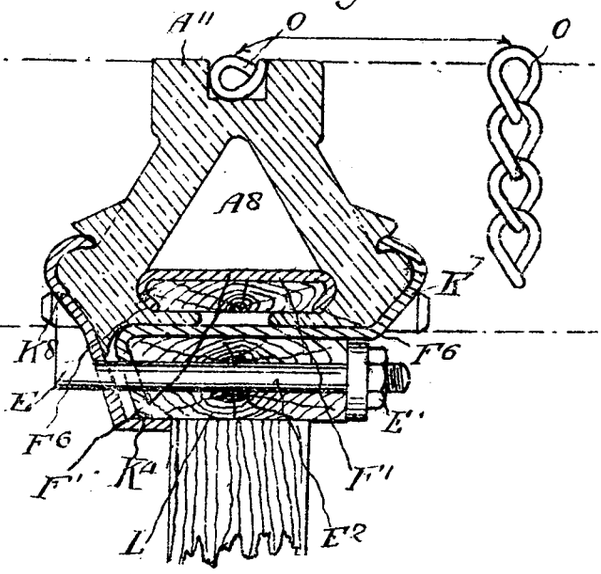


Fig 8

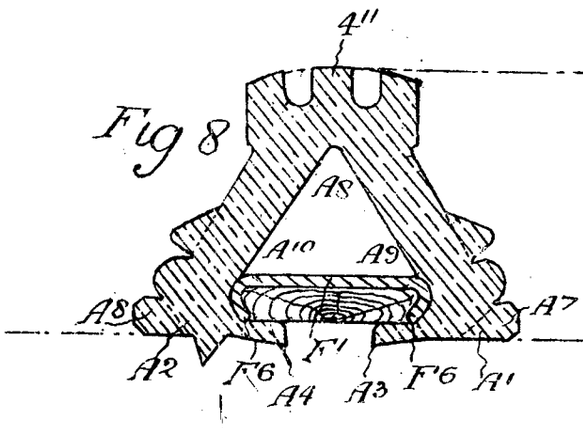


Fig 1.

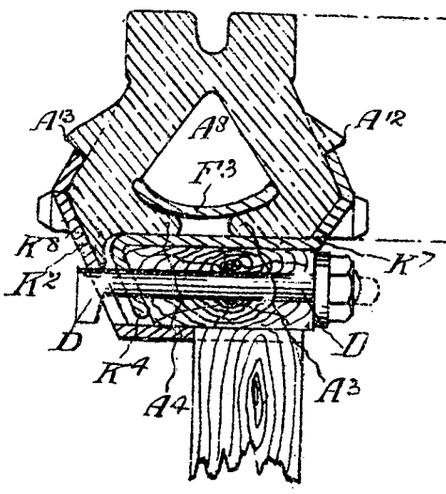


Fig 12.

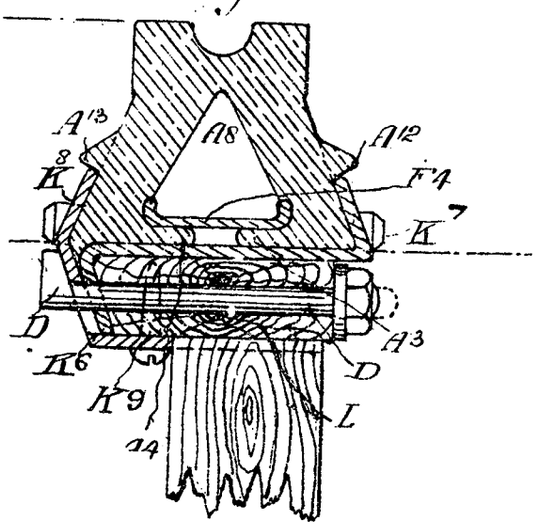


Fig. 7.

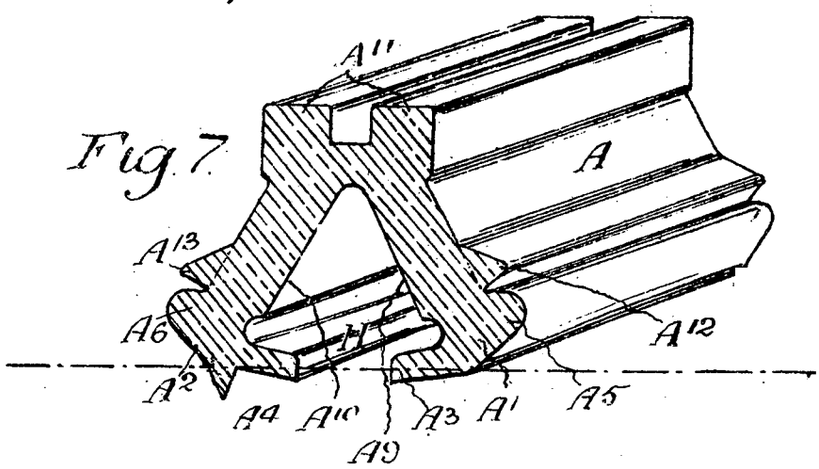
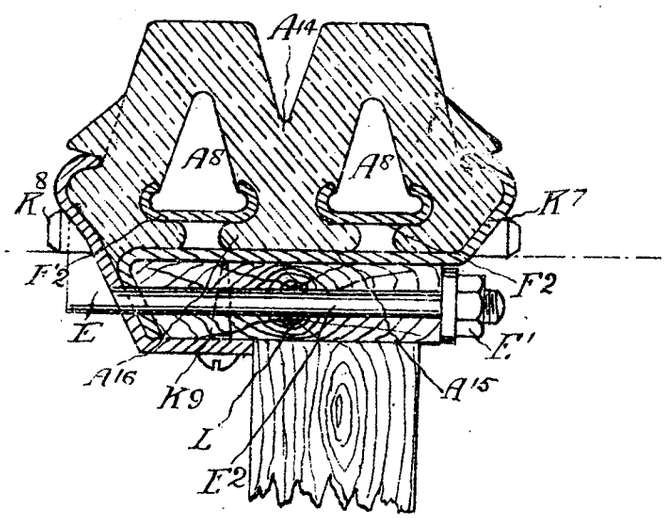


Fig. 10.



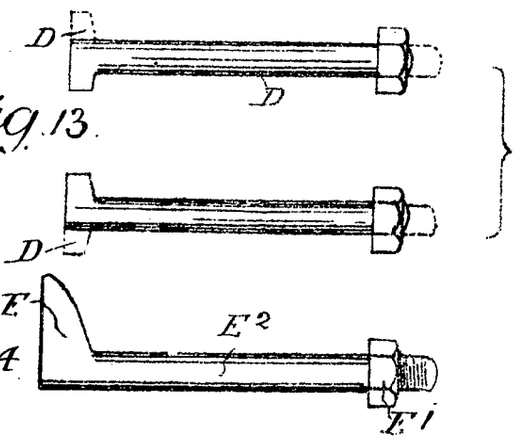


Fig. 13.

Fig 14

GOVERNMENT OF INDIA.

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SPECIFICATION

No. 4. 2nd January 1912.

(NOTE.—*The application for a patent for an invention of which this is the specification was accepted on* **5th February 1912.** *The acceptance is advertised in the next issue of the "Gazette of India." Within three months from the date of the advertisement, notice of opposition to the grant of the patent may be given under § 9 of the Indian Patents and Designs Act, 1911, and Rule 14 of the Indian Patents and Designs Rules, 1912.*)

IMPROVEMENTS IN PARACHUTES.

ADOLF FREIHERR ODKOLCK VON AUGEZD, OF 10, ELIASGASSE, BADEN NEAR VIENNA, EMPIRE OF AUSTRIA, GENTLEMAN.

The following specification particularly describes and ascertains the nature of the invention and the manner in which the same is to be performed.

My invention relates to parachutes and has for its object a mechanism for efficiently and reliably opening parachutes, attached to persons or objects above the ground. As experience shows, most of the accidents with parachutes are due to the fact that the parachute does not fully open and therefore cannot carry the full load or is prevented from properly operating by the object itself which it is designed to carry.

For avoiding these inconvenients and thereby rendering parachutes perfectly safe in use I provide according to my invention means for shooting the parachute as a whole upwards by a driving agent, such as an explosive charge or fluid under pressure, and for shooting outwards its ribs or periphery by driving agents, such as explosive charges or fluid under pressure, before the load to be carried by the parachute becomes operative upon the same. Thus my improved parachute becomes a reliable means for escape for aeronauts, for persons in burning houses, and the like.

For compensating the recoil occurring on shooting the parachute I attach to the tube from which the parachute is shot a second tube extending in the opposite direction in which second tube an explosive charge is fired simultaneously with that serving for driving upwards the parachute, the explosive charge in the second tube and the resistance to the expansion of the explosion gases of such charge being so determined that the two tubes are subject to equal and—owing to the arrangement of the tubes opposite—recoil or reaction forces which compensate each other so that the two tubes as an entirety are not subject to any recoil. This is of particular importance when the device is used on aeroplans or balloons.

The annexed drawings show by way of example one constructional form of a device embodying my invention.

Figure 1 is a central longitudinal section of the same, figure 2 is a transverse section on the line A B, figure 5; figure 3 is a plan view of the head of the parachute rod, and figure 4 illustrates the construction of the device when provided with a second tube for compensating for the recoil.

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The shooting device for the parachute as a whole consists of a tube 1 similar in construction to the barrel of a firearm and is secured to any desired part of the aeroplan, balloon, building or the like in a vertical or inclined position by means of a standard 2. In the end of the barrel next to the standard there is provided a chamber 3 for receiving the driving agent, preferably an explosive charge, for instance gunpowder. In this case the channel 4 leads from the chamber 3 to the bottom of the tube where a percussion primer 5 and a striker or firing pin 6 are arranged in any suitable manner. The arm 7 of the striker is connected with a trigger cord 10 preferably by means of a metal eyelet 8, and is so shaped that the eyelet 8 engages a notch in the arm 7 normally closed by a plate spring 9 so that the eyelet cannot slip accidentally from the arm 7. A sleeve 11 is adapted to slide along the tube 1, and to this sleeve that part of the device is secured which serves for driving outwards the ribs or the periphery of the parachute, that is to say, for opening or unfolding the same.

This part consists of any suitable number of relatively short tubes 12 arranged radially. The inner ends of these tubes constitute chambers for receiving the driving agent, such as explosive charges, such chambers being connected by channels 14 with an annular channel 15 in a boss 16 to which the tubes 12 are secured. The boss 16 is fast on the sleeve 11. A firing mechanism of any suitable construction consisting, for instance, of a primer 17 and a striker 18 with a trigger cord 19 is secured to the boss 16 at some suitable place. The trigger cord 19 is considerably longer than the distance between the striker 18 and the standard in the normal position of the former, the other end of the cord 19 being fastened to the standard. When the device is ready for use the central rod 20 of the parachute fits into the tube 1 as shown in figure 1 and carries at its upper end the head plate of the parachute, such head plate consisting of a rigid plate 21 provided with equidistant hobs serving for securing the parachute cords 24 whereby, when the parachute is unfolded, the regularity of its shape is ensured. The cords 24 are fastened in the well-known manner to the fabric constituting the body of the parachute and to the outer edge or periphery of the fabric or to the ends of the cords, the cords carrying the load are attached. The head plate of the parachute is provided with holes for the passage of air when the parachute falls together with the load for the purpose of preventing the parachute from tilting and its fabric from bursting. A number of cords 24 corresponding to the number of tubes 12 carries short plungers 25 which when the device is ready for use are in the tubes 12. In the example shown, in which the device is designed to be used on an aeroplan or on a balloon, the standard 2 is secured to some part 26 of the frame and the trigger cord 10 is within the reach of the pilot. The long ropes for carrying the load are suitably coiled or wound and fastened to a waist belt or the like carried by the pilot. The fabric of the parachute is folded round a framework surrounding the device. The plungers 25 are in the tubes 12 and the rod 20 in the tube 1. The chambers 3 and 13 are charged with an explosive, the trigger cord 19 is fastened to the standard, and the strikers 6 and 18 are in the position of rest shown in figure 1. The frame may be provided with a cover which may be readily removed or destroyed. Instead of the head plate 21 a larger disc 37 may be secured to the rod 20 as shown in dotted lines in figure 1 on which the folded fabric of the parachute is placed and covered by a hood 38 of fabric or the like. The outer edge or periphery of the fabric is connected to the plungers 25 by cords 24' so that on shooting the parachute and the plungers 25 the parachute is unfolded and opened, the hood 38 being thrown off. This unfolding is very regular owing to the fact that the fabric is regularly folded on the disc 37.

According to figure 4 the tube 1 is connected with a similar tube 28 coaxial with it, so that the open mouths of the two tubes are on opposite ends.

For facilitating the arrangement of the igniting channels the two tubes are preferably separated by an intermediate block 29 in which the igniting channels 4, 30, 32 are provided. One of the channels, say 30, leads outwards to a primer 5 situated by a striker 6. The igniting channels 4 and 32 connect the channel 30 with the chambers in the tubes 1 and 28, respectively, containing the explosive charges. Into the tube 1 the rod 20 of the parachute is inserted

and into the tube 28 a tightly fitting plug 35, for instance, of soft metal. The outer end of the tube 28 is conical, resembling a choke bore barrel to such an extent that the plug 35 on being shot out from the tube 28 and owing to the choke bore of the latter meets with a resistance which is equal to the resistance offered by the parachute to its being shot out from the tube 1. Consequently the recoil due to the shooting of the parachute is equal to the recoil due to the shooting of the plug 35, and owing to the arrangement of the tubes the recoils are in opposite directions, and therefore the tubes 1 and 28 as an entirety and the structure in which they are mounted are not subject to recoil at all.

For preventing the plug 35 from leaving the tube 28 with too great a velocity this tube may be provided with a cylindrically bored extension beyond its choke bore portion, such extension being provided with lateral openings 36 for the escape of the explosion gases, when the plug has passed such openings. The pressure on the plug is thereby relieved so that it leaves the tube with a comparatively small momentum or may be stopped in the part of the tube 28 extending beyond the openings 36 by simply closing the outer end of this tube. Instead of producing the resistance in the tube 28 by a choke bore and a plug it may be produced by other means, for instance by closing the mouth of the tube 28 by a disc of sufficient strength which is torn by the explosion gases.

The operation of the device above described when used on an aeroplan or balloon is the following :—

In case of emergency the pilot pulls the firing cord 10 and thereby turns the striker 6 to such an extent that the eyelet 8 escapes from below the plate spring 9 whereby the striker is first cocked and then released, and thus strikes against the primer 5 and fires the explosive charge in the tube 1 so that the folded parachute is driven upwards taking with it the sleeve 11 and the device for unfolding the parachute and stretching and tightening the firing cord 19. The latter cocks and releases the striker 18 whereby the explosive charges in the tubes 12 are fired at a moment when the parachute is so far above the aeroplan or balloon that it can unfold freely, the length of the cord 19 being suitably chosen for this purpose. On firing the explosive charges in the tubes 12 the plungers 25 are shot radially outwards, causing the parachute to unfold properly by means of the cords 24. The length of the cords carrying the load is so determined that it is only after unfolding the parachute that they are fully stretched so that the load to be carried by the parachute is taken up by the same only after it has been properly unfolded and thus is securely supported by the parachute which then descends slowly together with the load.

Simultaneously with shooting the parachute the explosive charge in the tube 28 is fired and the plug 35 is driven out or the disc closing the mouth of this tube is torn whereby the recoil is compensated or deadened.

The device may also be used as a fire escape in buildings in which case the second tube 28 may be dispensed with. For this purpose the parachute may be mounted near a window in such a manner that it is shot obliquely upwards for bringing it out of the reach of the flames. This oblique position of the parachute is also necessary when the device is used on a biplan for avoiding the upper supporting surface. The length of the cords has to be determined according to the conditions in which the device has to be used. Any desired construction of parachute may be used. The device may also serve for throwing up signal lights, such as light balls, rockets or for firing projectiles from aeroplans and balloons without subjecting the latter to recoil.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is :—

1. A device for operating parachutes mounted on structures above the ground characterized by the feature that the parachute is mounted on a shooting device which on being actuated drives the parachute upwards and unfolds the same.

2. A device as per claim 1 characterized by the feature that the parachute is fastened with its centre to a rod inserted into one end of a tube, the other end of such tube containing an explosive charge and a firing device.

3. A device as per claims 1 and 2 characterized by the feature that cords of which each has attached one of its ends to the periphery of the parachute are fastened at their other ends to plungers inserted into tubes at right angles

to the axis of the parachute, the inner ends of such tubes containing explosive charges and being provided with firing devices actuated by the parachute as it is shot upwards.

4. A device as per claims 1, 2 and 3 characterized by the feature that the tubes at right angles to the axis of the parachute are secured to a sleeve loose on the tube coaxial with the parachute, so that when the parachute is shot upwards it at first takes with it the said tubes whereby the firing device for the same is cocked and released.

5. A device as per claims 1, 2, 3 and 4 characterized by the feature that the inner ends of the radial tubes at right angles to the axis of the parachute which chambers contain explosive charges are connected with each other by a channel likewise filled with an explosive charge so that all the radial tubes are fired simultaneously.

6. A device as per claim 1 characterized by the feature that to the tube for shooting the parachute rod is secured another tube coaxial therewith and having its mouth in the opposite direction, such tube containing an explosive charge so determined that the recoil due to the firing of the latter is equal to the recoil due to shooting the parachute so that when the explosive charges of both tubes are fired simultaneously the two tubes as an entirety are not subject to recoil.

7. A device as per claim 6 characterized by the feature that the bore of the second tube tapers towards its mouth, a plug being inserted between the explosive charge and the tapering bore of this tube, so that on firing the explosive charge the plug is driven out through the tapering bore undergoing deformation and thereby increasing the recoil.

8. A device as per claim 6 characterized by the feature that the second tube is closed by a disc of sufficient strength.

A. F. O. VON AUGEZD,

by his Attorney and Agent,

RUPERT REMFRY.

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Fig. 1.

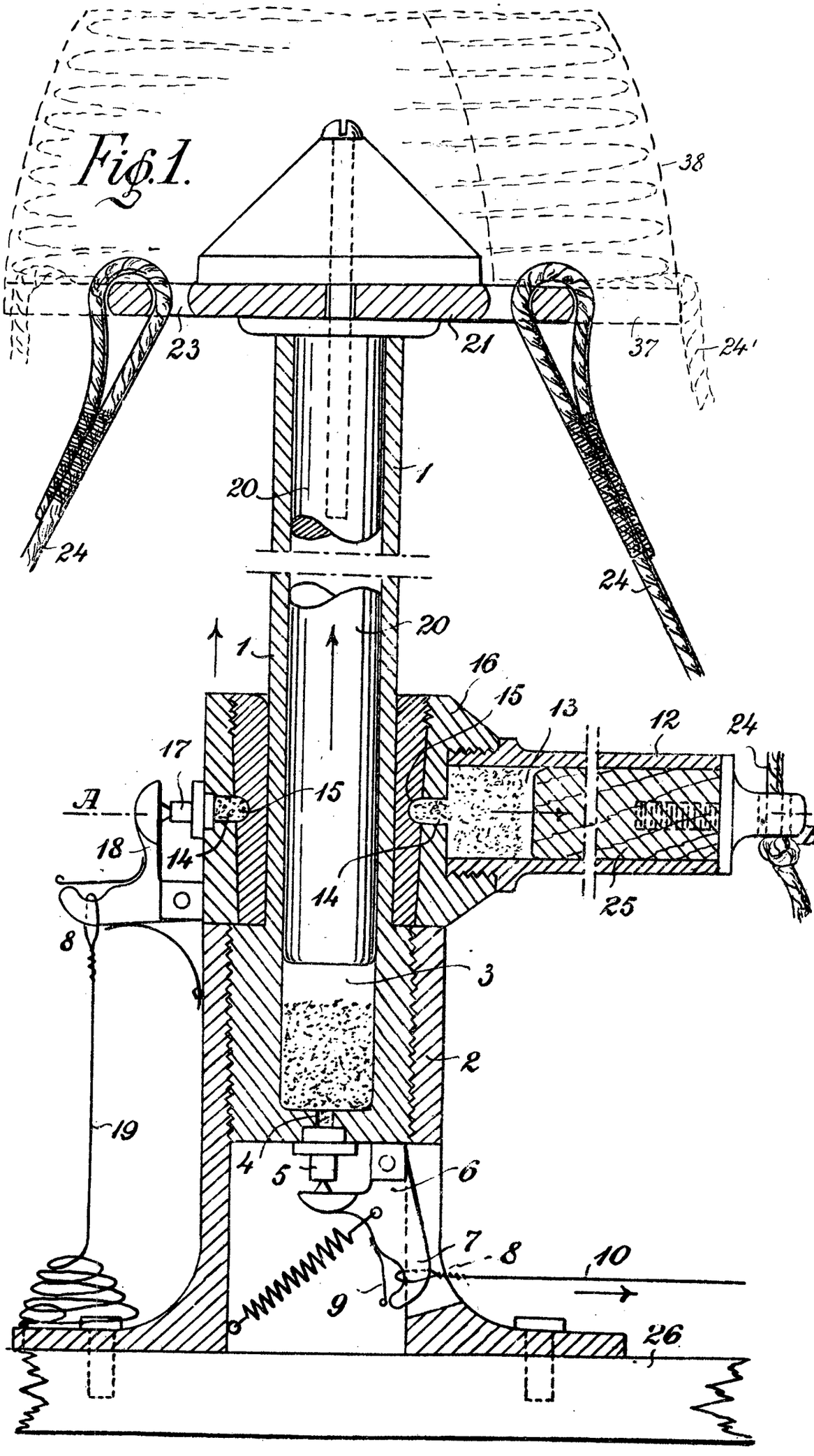

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Fig. 3.

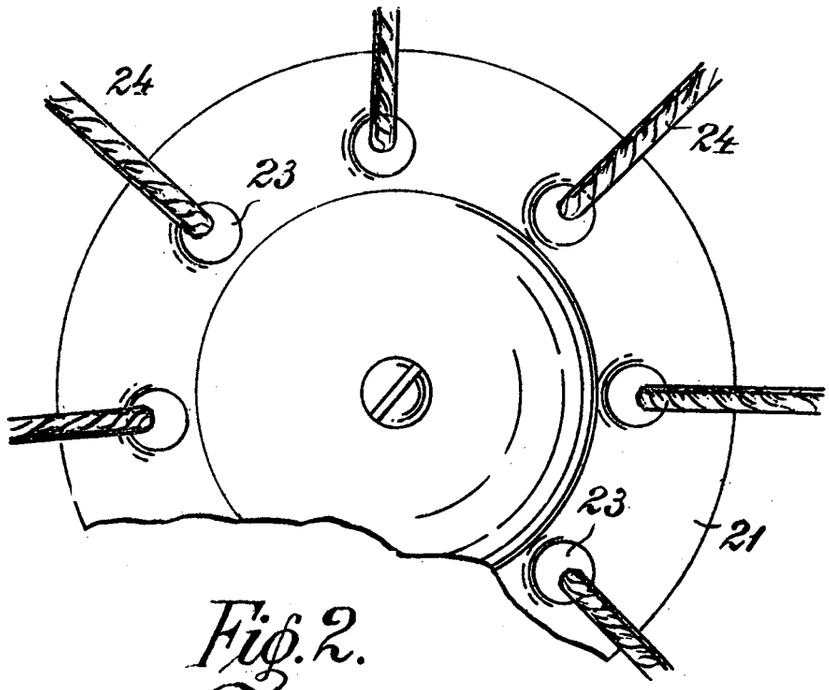
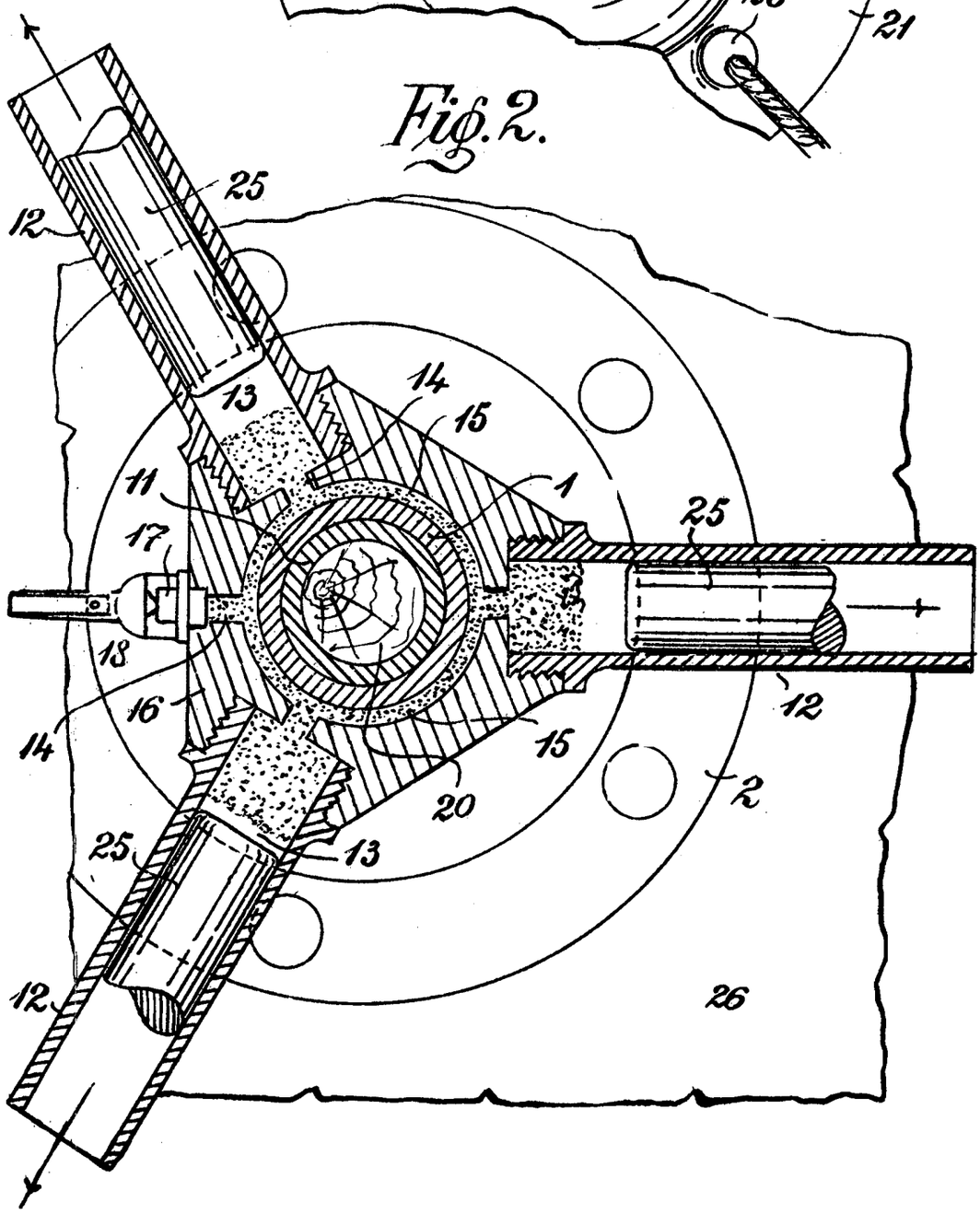


Fig. 2.



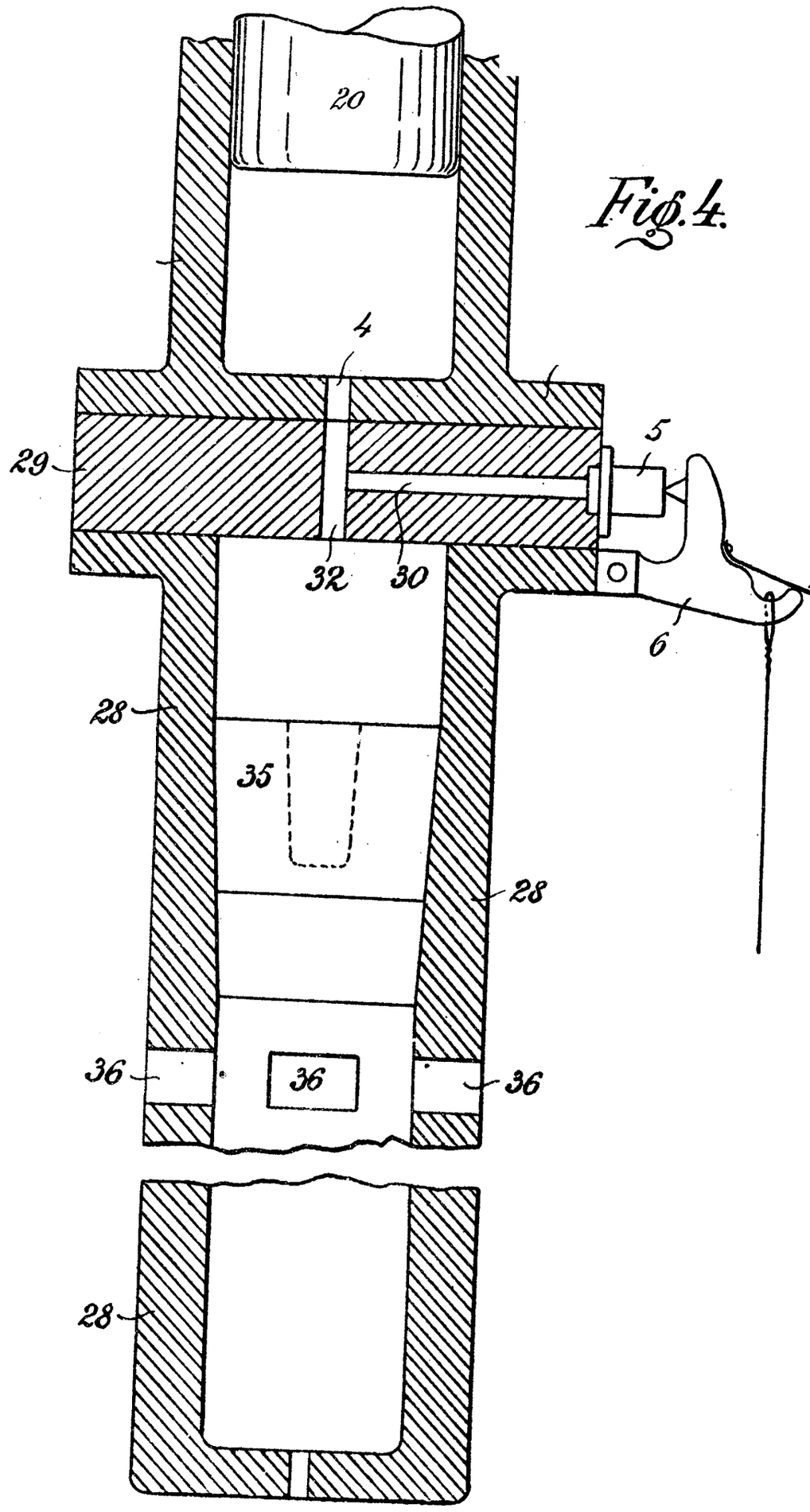


Fig. 4.

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To

The First Asst to the Hon'ble the Resident in Mysore.

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Sir,

gned by

CS Balasundaram

In forwarding herewith copy of letter No. 1184-P dated the 18th March 1912, from the Controller of Patents and Designs, Calcutta, enquiring whether the Mysore Govt are prepared to accept a complete set comprising the specifications printed under the provisions of the Indian Patents and Designs Act II of 1911 and Rules thereunder, I am directed to request

over.

SUBJECT.

Typed 10-4-12 MAR.

6/14

that you will be so good as to communicate to the Controller of Patents and Designs that the Durban have no objection to receive the set in question, and make arrangements for the public to have free access to it.

2. It is premised that no cost is intended to be recovered from the Durban for the specifications thus sent to them.

I have &c,

USB 6/4/12

For Mr Secretary

4.4.12

US-41

List of enclosures,

one.

Copied by

Examined by

GPB—10,000—28-2-11.